READ: 31 DEC 81 08:41:42

FROM: DAVE, K8MMO
TO: HANK, KA6M
SUBJ: XEROX
1. RECEIVED THE XEROX MAILINGS TODAY. THANKS MUCH. I WILL TAKE THEM WITH ME ON XMAS TRIP.
2. AM TRAVELLING TO SACRAMENTO THUR TO VISIT EXWIFE AND KIDS. WILL BE BACK IN BUSINESS AFTER XMAS ON 28TH. LOTSA WORK TO DO AS MAJOR SOFTWARE DELIVERY COMING FROM WEST COAST BACK HERE AND HAVE TO GET IT READY TO SHIP TO FIELD.
3. NJ GANG IS HUMMING. GET CALLS EVERY FEW DAYS NOW AS THEY COME UP WITH TWO REPEATERS (NORTH AND SOUTH NJ). WISH I HAD THAT MUCH INTEREST AROUND HERE.
4. ACTUALLY ITS PICKING UP HERE. I HAVE THREE MORE PEOPLE TRYING TO COME UP. MY REPEATER IS UP BUT POOR LOCATION/RF OUT COMBINATION. ON TOP OF THAT, THE TNC RADIATION GETS INTO THE RECEIVER, DESENSING IT. I HAD TO HIDE IT BEHIND POWER SUPPLY TO RECEIVE ANYTHING. POWER IS 20 WATTS, GOING TO 80 SOON. I HAVE TO CHANGE RIGS SINCE I WANT MY IC2AT BACK. IT IS TOO NEAT A RIG TO LEAVE ON THE REPEATER. I HAVE AN OLD ICOM TO PUT ON REPEATER AND GET MY NEAT HANDHELD BACK.
MERRY XMAS AND HAPPY NEW YEAR PACKETS TO THE SF GANG FROM WASH..73 DAVE

MSG#:A39895
IN#: 62
TO: HM
FROM: PRNET DML
SENT: 23 DEC 81 22:45:20
READ: 31 DEC 81 08:42:23

Hank,
Strange things appear to be happening to the conferencing system, so here is this one over again as you probably missed it the first time.

MSG#:A37996
IN#: 153
TO: DML
FROM: PRNET DML
SENT: 20 DEC 81 14:31:35
READ: 20 DEC 81 14:33:33

Hank,
Can you give me an idea of what it is you are expecting to happen to 8273 prices? I have 25 on order now and anticipate their arrival shortly.

In general, I am assembling parts sufficient to build 100 kits of the board. This will include crystals etc. but not 100 all at once for the 8273 and 8250, for obvious financial reasons.

If there is any chance the 8273 is going to suddenly fall down the learning curve, then it is undoubtedly best to remain with it.

Still not back on my feet yet, so it will be the new year before I begin to get the new design ideas. Some flu!

Doug is still incommunicado, since he always misses me at work when he uses the tie-line.
Regards,
John Spragg

TO: Hank KA&M

TO: Hank KA6M
FROM: Bill WB6SDE
Hello, Hank
Just wanted to wish you and yours the best of a NEW YEAR and the best also

to all those you have helped and are trying to help! 73 and hope this
commins year brings out the best ifor all of us....
Bill

P.S.
Have a MERRY CHRISTMAS, one and all!!
  AJS

MSG#:A40177
 IN#: 63
  TO: HM
FROM: PRNET   DML
SENT: 27 DEC 81 13:01:22
READ: 31 DEC 81 08:43:03

TO: John, Hank, Paul and Larry

I have my antenna up and operating here at my new QTH. I will now be able to make scheds on 20, 15 or 10. I have a 22 element Cushcraft array at 60 feet for 2 metres and a TH6DXX Hysain beam at 50 feet. On two metres I can work most of the repeaters in New York state west of Rochester but I can't work Rochester because of a hill to the east of me.

My new address is:
29 Shamokin Drive,
Don Mills, Ontario M3A 3H7

I hope you all had a merry Christmas and I wish you all a happy new year. I also hope we accomplish great things for packet radio in 1982.

73, Doug, VE7APU/3

ALL MESSAGES READ

Hank,

The monster lives . . .

Not only does the board accept commands, it spits out data as well. I wrote a two page routine to attempt to receive packets on 146.58. It works wonderfully. I'm eavesdropping now..

73, Mojo, AA4kb

P.S. MX/HNY

And remember:

Roses are Reddish
Violets are blueish
If it wasn't for Christmas
We'd all be Jewish.

TO: Hank, KA6M

From: Bill, WB6SDE

Hello, Hank.. Just a s
hort Merry Christmas and a thanks for the work
you and Stu and whomever else has done to the system. The response is
much improved from up here in the North Pole XXXXXX bay. (Acutally, it
is cold enoush these days to think polarized) Anyway, thanks again!!!

73, Bill

DATE: 17 DEC 81
TO: HANK
FROM: DAVE

OK ON THE REPEATER, IT IS ALREADY ONE THAT I SOMETIMES LISTEN TO.

I GUESS I GOT MIXED UP WITH MY APPLE COMPUTER EPROMS AND THE VADGC EPROMS.
ALL I HAVE IS 2716'S SO I GUESS I'LL TRY AND GET SOME 2708'S.

73
DAVE

TO: HANK
FROM: DAVE

HANK, WITH MY NEW FT208 I HAVE THE ABILITY TO EAVES DROP ON
REPEATERS AROUND HERE, WHILE I AM FOOLING AROUND AT HOME I
USUALLY HAVE THE HT ON, WHICH BRINGS ME TO THE POINT:
WHAT REPEATER DO YOU HANG OUT ON?

I HAVE ONLY ABOUT ANOTHER MONTH TO WAIT FOR MY LICENSE,
SO I WOULD LIKE TO GET A SET OF PROMS TO START SETTING UP
MY PRNET STUFF. AFTER THE HOLIDAYS WOULD PROBABLY BE OK.
I HAVE SEVERAL 2716S SOME OF WHICH I DONT KNOW THE STATUS OF.
DO YOU HAVE AN ERASER FOR PROMS AND ARE YOU WILLING TO TRY
AND PROGRAM WHAT MAY BE DUDS FOR ME?

I AM NOT TRYING TO BE AN ANARCHIST,BUT WHEN YOU GET THE STUFF
FROM DAVE K8MMO ON THE 6502 (DEN'S IN TUSCONS ACTUALLY)
I WOULD LIKE TO GET A COPY OF THE PRINTS.
^Z
DAVE

DATE: 15 DEC 81
TO: ALL WHO HAVE VADIC 202 MODEMS
FROM: DAVE ENGLE

HERE IS THE INFORMATION THAT IS NEEDED TO CHANGE THE VADIC 1230D MODEM BOARD TO OPERATE IN A MANNER ACCEPTABLE TO PACKET RADIO.

THERE ARE THREE CHANGES PRESENTED IN THIS NOTE, THEY ARE:

1. A CHANGE TO ALLOW THE DATA SET READY (MODEM) TO GO ACTIVE WITHOUT HAVING TO ANSWER A PHONE CALL.

2. A CHANGE TO SEPARATE OF THE TRANSMITTER AND RECEIVER LEADS.

3. A WAY TO ALTER THE TIME DELAY BETWEEN REQUEST TO SEND (RTS) INITIATION AND RECEIPT OF THE CLEAR TO SEND (CTS) SIGNALS.

1. ENABLE COUPLER CUT THROUGH -- MAKE DATA SET READY:

   A. VIEWING BOARD WITH PC CHASSIS CONNECTOR TO LEFT (WHITE BOXES TO LEFT ALSO).

   B. LOCATE M16 ETCHED ON BOARD (MIDDLE, BOTTOM).

   C. FIND 62K RESISTOR TO LEFT OF M16 ETCH.

   D. UNSOLDER LOWER END OF 62K RESISTOR FROM BOARD.

   E. LAY LOWER END OF RESISTOR ON FAT TRACE THAT WENT UNDER THE RESISTOR IN IT'S ORIGINAL LOCATION.

   F. SOLDER THE LOWER END OF THE 62K RESISTOR TO THE FAT TRACE.

   THIS WILL SUPPLY A NEGATIVE (TRUE) SIGNAL TO THE CCT ENABLING THE MODEM'S DATA SET READY (DSR) SIGNAL.

2. SEPARATION OF THE TRANSMIT AND RECEIVE DATA LINES:

   A. REMOVE STRAP "A", IT LOCATED AT THE TOP LEFT END OF THE SMALL WHITE BOX. THIS WILL SEPARATE THE TRANSMITTER AND THE RECEIVER.

   B. REMOVE STRAP "T", IT IS LOCATED NEAR J2 (THE 9 PIN CONNECTOR). THIS UNGROUNDS THE DATA TIP J2 PIN 8,

   C. UNSOLDER THE WIRE FROM J2 PIN 6 AT THE PC CARD END. THIS REMOVES -12 VOLTS FROM PIN 6.

   D. SOLDER THE LOOSE END OF THE PIN 6 WIRE TO THE TOP HOLE OF STRAP "T". THIS PROVIDES A SIGNAL COMMON FOR THE TRANSMIT AND RECEIVE LINES.

   E. UNSOLDER OR CUT THE WIRE FROM J2 PIN 9 AT THE 1K RESISTOR. TAPE OFF THE END OF THIS WIRE AS IT WON'T BE USED. THIS IS A SAFETY MEASURE TO REMOVE +12 VOLTS FROM THE COMMUNICATION LINE CONNECTOR.

   F. RUN A WIRE FROM STRAP "A" RIGHT HOLE (TRANSMITTER OUT) TO THE BOTTOM HOLE OF STRAP "T" (DATA TIP). THIS CONNECTS THE TRANSMITTER TO THE COMM CONNECTOR (J2).

THE COMMUNICATION LINE CONNECTOR J2 IS NOW CONFIGURED WITH:
J2 PIN 6 AS SIGNAL COMMON,
J2 PIN 7 AS RECEIVE DATA (DATA RING),
J2 PIN 8 AS TRANSMIT DATA (DATA TIP),
J2 PIN 9 IS UNCONNECTED.

3. ALTERATION OF THE TIME DELAY BETWEEN REQUEST TO SEND (RTS) AND CLEAR TO SEND (CTS):

A. THE PRESENT TIME IS SET BY A RESISTOR (57.6K) AND CAPACITOR (3.3 MICROFARADS) AT APPROXIMATELY 200 MILLISECONDS.

B. THE NEED TO ALTER THIS WILL BE DETERMINED BY THE SPEED AT WHICH YOUR TRANSCEIVER CAN SWITCH FROM RECEIVE TO TRANSMIT (AND COME UP TO FULL POWER). THE VANCOUVER BOARD WILL RAISE RTS AND THEN SEND DATA AS SOON AS IT GETS CTS IN RETURN, SO THE TRANSMITTER RF UNIT HAS TO BE READY TO GO AT CTS. SYNTHESIZED RIGS AND RIGS WITH RELAYS IN THEM (RATHER THAN SOLID STATE SWITCHING) WILL PROBABLY NEED A LONGER TIME DELAY.

C. THE TIME VALUE IS EQUAL TO THE RESISTOR VALUE (IN OHMS) TIMES THE CAPACITOR VALUE (IN FARADS), DOUBLING THE CAPACITOR VALUE WILL DOUBLE THE TIME VALUE ETC.

D. THE RESISTOR AND CAPACITOR ARE LOCATED JUST TO THE RIGHT OF THE M20 LABEL ETCHED ON THE PC BOARD (BOTTOM). THE RESISTOR IS JUST ABOVE M20 LABEL, THE CAPACITOR IS BELOW THE M20 LABEL (WATCH OUT THE RESISTOR IS CODED WITH A FOUR BAND COLOR CODE).

HAVE FUN, IF YOU HAVE ANY PROBLEMS GIVE ME A CALL AT HOME 408/251-2910 IN THE EVENING.

73
DAVE ENGLE

TO: HANK
FROM: DAVE

HANK, WITH MY NEW FT208 I HAVE THE ABILITY TO EAVES DROP ON
REPEATERS AROUND HERE. WHILE I AM FOOLING AROUND AT HOME I
USUALLY HAVE THE HT ON, WHICH BRINGS ME TO THE POINT:
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MY PRNET STUFF. AFTER THE HOLIDAYS WOULD PROBABLY BE OK.
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FROM DAVE K8MMO ON THE 6502 (DEN'S IN TUSCONS ACTUALLY)
I WOULD LIKE TO GET A COPY OF THE PRINTS.
^Z
DAVE

Date: 15 Dec 81

To: Hank

From: -cas-

I have the followins items for sale:

ROBOT 400	575.00
ROBOT 400	575.00
ROBOT 800	675.00
YAESU FT-301D	475.00
	2300.00

If anyone in the packet sroup is interested,
I will let the above so as a packase for----------> $2000.00 !!!!
Cash-Cashier's Check-Moneyorder or trade for new (fat chance) IBM micro.
I also keep my equipment in excellent condition. de N6ECT "Curtis"

Dave,

Thanks for your several responses to my letters. Time, too, has been very critical here, as the Xmas push goes on and other projects, such as helping some Polish refugees find jobs has taken precedence. Am going to visit relatives in Chicago & Indiana over the Holidays, so not much will happen until January.

I have some hardware to play with, the software is the tough item to deal with. The 27 point note was an attempt to organize my thinking in that area, and I think it laid out some of the issues.

I have some serious concerns about dissipation of development efforts with the increasing proliferation of cpu/sdlc chip combinations we are seeing. I was fully prepared to support the 8273, but now you and others are turning away from it. Either chip is ok with me, but by my count we now have about 4 cpu's (8085, Z80, 6502, 8088) to support, with the 8273 & 1933, with STD & single board versions of each, in PASCAL C & Forth, which leads to more than 48 different combinations if you throw in a few assembly language efforts. Who is going to write all the code to make all that stuff work together? I love diversity, but there just aren't enough people to spread the effort so thin. We have all tremendously benefitted from the common work on the VADCG, and I would like to see the continuation of coordination of a common approach amongst the main US & Canadian sites. Perhaps your group can suggest some guidelines to use to channel energies towards a set of well defined goals.

I am very, very low on 8273's at the moment, and won't order any more until talk of freebies goes away. As you know, it would hurt to set stuck with $$$'s of inventory while everybody is paying nickels and dimes. I'd be very happy to arrange an order if I have specific customers for specific quantities.

Will check on the current state of affair re the WD1933.

Have made voice contact with Skip in Palos Verdes. His system RCPM is very impressive, and may be only two hops from here. Would be an excellent target for us to shoot for.

MaJo, AA4KB, has just finished breadboarding an 8273 onto a TRS-80. Will let you know when he's flying.

Ed Mersich, WA6RZW, has successfully ported the software to an H8, and would be happy to share war stories with any interested parties.

The Cermetek now works about 97% of the time. Have not had a chance to go back there to discuss the last few [illegible].

73 ... Keep those postcards and letters coming ... Hank

TO: HM
FROM: PLR
SENT: 14 DEC 81 18:23:03
READ: 14 DEC 81 20:21:40

TO: Hank, KA6M
From: Dave, K8MMO
Subj: 1933 Chips and Internet

1. Terry, our hardware type, would like to experiment with the 1933. I am holding on to mine for the STD Station Node. What is the current price and can you get us a couple?

2. Also noticed in Electronics that arrived today that Xerox is offering "The Internet Transport Protocols" and "Courier: The Remote Procedure Call Protocol" as encouragement for using Ethernet. Stuff is available from Xerox Corp.,Office Products Division, Network Systems Administration Office, 333 Coyote Hill Rd., Palo Alto, Calif. 94304. Looks like worth reading. Also article on page 133 talks of Unix and Ethernet linkup using ARPA internet and transmission-control protocols. Looking better for internet all the time.

3. It is time to write some software for the STD box for Internet stuff. Wish I could find some time for this. Suggest you replace repeater with VADCG repeater and use hardware for Internetting North and South bew repeaters. Or, just build another STD box. I am working on it slowly.

73...Dave

The following letter was mailed on 10-DEC-81 at 11:22:49.

From: -cas-
To: Hank
Date: 10 Dec 81

I am sorry to have added problems to your day. I wasn't paying attention to what I was doing and there were too many things going on here and I typed by mistake...the rest is history. Thanks for the Fortran stuff, I appreciate it.

When you visited, I didn't have a chance to show you some of the more "far fetched" research projects that I have been working on, and I thought that I would mention some of what "has been going on".

I can't remember if I told you that my basic education was in psychology, and that I have been working on a book dealing with evolutionary environmental conditionings. Since this is such a broad topic I have been accumulating information for about 15 years. Now to the point. In 1979 we discussed an upcoming event called "The Jupiter Effect". It specifically refers to an alignment of planets that would be on one side of our planet with the sun on the other side. With the magnaspheres of these planets in close proximity, there will be an incredible pull on the earth. Every time this has happened in history, there has been an increase in tidal waves, earthquakes, etc. Since these effects also have influence on the human species (my opinion), there are also psychological variations wich occur. What does all this have to do with anything??? Well this effect (Jupiter) begins in 1982 and the alignment of the planets is happening now! I have noticed that there have been increasing presures on those people around me....totally hectic.... Since man has survived by being able to adapt to the environment and since this effect is happening for the first time....as to be able to record the variations ...it is proposing some NEW and interesting information. One of the things that I mentioned to you before about this way of looking at things was "the troubles with electronic devices 'computers', etc." when there were opositions to the planet Uranus. All in all it is rather fasinating to be able to cross reference this stuff. I thought that you might be interested, but the subject is very lengthy, so I will cut it short for now. Remember that these particular times will create a lot of stress and agitation, and that by knowing this will sometimes soften the load.

Again I would like to thank you for all the work that you have done in & for packet radio, and the use of the DG, and am sorry if I come off like a pain-in-the-***.

73, best regards to you and yours..... -cas-

To: Hank, KA6M
From: Bill, WB6SDE
Subject: Receiving Mail Messages

Hi, Hank - Merry Christmas!
It looks like I will be able to check into the repeater about once
a week - perhaps activity on my part will increase after the first of
the year, but once a week seems about max at the moment. I say this with
some regret, for I am interested in Packet radio much beyond that.
However, when I do check in (Sunday 1:30 AM this time)
I have found some rather large files to scan through.
I am extremely interested in them, particularly your
considerations toward deriving some sort of a specification for packet
standards.

However, at the present time I am not able to read them in the
detail I would like, so I wonder if I could make a special request of you?
Is there any way you could save off the larger files under some generalized
category, then send me a short message indicating the file is available to read?
Presently, I have several text files under my call, which I would like to get to
to at some point, but the list is ever increasing. I would like to read the
text you have generated, perhaps save it off on disk here locally,
but would also like to keep the mailbox function current by erasing all
but the most recently received messages.

So if you could use the broadcast function to send
or rather alert me (us) to the fact that some new consideration or letter
is worth reading, I would be happy to get to it as soon as I am able to
take a look. In the meantime, I can compile a list of such files, while
keeping the gross number of mail messages to the current minimum.

Thanks, and sorry I have missed so many meetings. Work is remaining
somewhat overwhelming. Hi.,

Bill

Date: 13 December 1981
To: All Packet Stations
From: Hank Magnuski

Here is a message I recently received from the mailbox at WB6YMH. I had a chat with Skip, and connecting to his system looks like a worthwhile target for our first down-the-coast link. I think we should actively pursue the establishment of sites to be able to reach his radio bulletin board.

While connected I pulled all outstanding messages on his system. Your are welcome to look at the file, which is called WB6YMH.MSGS It is rather long, so I'm not putting it in everyone's mailbox. It will be deleted sometime in January.

Msg # 141, 12/05/81 from SYSOP
To HANK KA6M '(WELCOME)'
Welcome Hank! I was sorry I was not around when you called in I would have enjoyed chating with you. From what I have read and heard around the country I gather that you have the most active group of packet radios types in the country (if not the world), I have been planning on running a data repeater for several years, but the packet concept is very new to me, but I am reading and following the progress as closely as I can. I plan the have this system connected to my 2 meter repeater by the end of the year (I have just got MP/M running 3 users), the system will not be packet at that time, but I will be looking into it as activity builds. I am very interested in store and forward, and packet and would very much be interested in linking with your group. I have a remote base system on Onyx peak (9114 feet),that system is able to talk to ground stations in the Fresno area,(with good ant.) it may be possible (cont.)

MSG # (2 - 155) to read (<return> to end): 142

Msg # 142, 12/05/81 from SYSOP
To HANK KA6M '(CONT)'
to get a link going with one additional station in Fresno if your system is able to be worked from there. Onyx talks into both the Phoenix and Las Vegas areas and I am working on a friend in the Vegas area who has a system on a moutain at 6000 ft. that talks into Utah. His system is controlled with a 8048 and he seems interested in packet. I think we could get a lot done in short order if packet repeaters were added to existing remote base systems (sites and r.f. equip allready in place, all that would be needed is a controller and a modem.) I have been talking with Wally WA6JPR, who I think you know, and we are just full of ideas. Another friend of mine, WB6CYT Brian Kantor, is running a RCP/M in San Dieso and is also building a packet repeater, we hope to link our BBS systems together via packet some time next year. Again Welcome and "hope your packets CRC"
Skip WB6YMH (SYSOP)

TO: HM
FROM: PLR
SENT: 12 DEC 81 11:08:07
READ: 12 DEC 81 12:42:51

Hank,

1. I received the disk and commented on it in my last note but I guess it wasnt clear I got it fine, I am interested in the drivers for the 1933 chip, Our VADCG AMRAD repeater is doing fine so I don't want to implement that, but any 1933 work on the STD bus needs those drivers. Thanks again for the disk which I will return with our latest code.

2. I got another letter from an Intel employee with the basic same information. Intel has a large number of 8273 chips with bugs. This guy says the bugs can be programmed around in software. Paul is writing him (he should have sent you a copy of the letter) and asking what the scoop is.
Sounds like another case of the 10,000 chips date code 8050 and less having troubles slipping out of the buffered mode.

3. Den Connors is doing a 6502 board using the 1933 chip. Total cost (I think he gets free PC work) is $80. He is getting the 1933 chip for $15-$18 and thus chose it over the 8273 since the cheapest he could get that was $33. He is shipping us the schematic (will send you a copy) and a board when it is cut. We have a 6502 packeteer (W4CQI, Cliff) who loves the idea. Terry Fox (WB4JFI packeteer) wants to do a 1933 with Z80 board for AMRAD. Think that is best plan. We anticipate it will be harder and harder to get current board now that Doug is gone, maybe not but we are sceptical.

4. Den also is forming a Tucson chapter of AMRAD. He is working some deal with Paul. We will beef up the newsletter and send them copies. Ask Paul the deal. Yall might want to do the same.

5. I will mail you a QEX copy. Will include your chip checks also. Am going to get 10 modems from New Jersey, I guess I will never get out of Snake Oil business. How is Cermetek coming?

73's,Dave

Hank,

I have two questions regarding the schematic for the controller board.

There is a pull up resistor in the crystal oscillator that does not have a value. Could you find it for me? Also, the schematic is a little vague in that area, and it's my weakest design area. There are a couple of crossing nodes that appear that they should be connected.

Second, can I run the 8273 CLK input from the board clock divided by two? I do not have the system clock on the bus from the TRS-80, although I can get it.

I will indeed need a crystal from you, and will either drop by for it or get with you to arrange for perhaps a mail delivery. There are no signals in the TRS-80 that are any multiple of 38400. I can get within one percent, but I'd rather be accurate.

My board is coming along nicely. I have all the parts I need except the crystal. I'm wire wrapping the controller board, and it should be ready to test with some software soon. The only thing things that may slow me down is some consulting work that I've been offered by Dynabyte for some Z-80 programming.

I thoroughly enjoyed our meeting last week. Thank you for taking so much time away for me. By the way, I'll send you my TRS-80 interfacing schematic, if you're interested.

73, MOJO, AA4KB

Hi. Thanks for the demo.fort, but when you came on, I got kicked off and re-connected in time to see; "FORTRAN 5 12/11/81 10:02:50 -> AND the run of the program. I was glad to see that it worked. I will get John over here to help me polish up the roush edges.

I lossed into the HAMNET on Micronet last night and discovered soom interestins thinss. First of all, Howard Nurse is to be thanked for brins-ins attention to you and the packet radio network. He has been answerins a lot of mail concernins packet, and soon will have people checkins into the HF link, I feel. Second is a coincidense (and I am not correctins srammer and spellins this am) ;:; The last messase on that system I am puttins in tact... If you are interested in the Jupiter stuff, I will compose somethins a little better.....answay here soes.....

#: 1371 SEC. 0 - GENERAL INFORMATION
SB: JUPITER EFFECT
10-DEC-81 19:42:07
FM: BILL EVANS WB2RGY 70160,436
TO: ALL
DOES ANYONE KNOW WHEN THE "JUPITER EFFECT" WILL OCCUR? I KNOW IT WILL OCCUR SOMETIME IN 1982.
FOR THOSE OF YOU WHO DO NOT KNOW, THE "JUPITER EFFECT" IS THE ALIGNMENT OF ALL THE PLANETS IN THE SOLAR SYSTEM. NO ONE IS QUITE SURE WHAT THE COMBINED GRAVITATIONAL EFFECT WILL DO HERE ON EARTH. B.E.

See how interestins a messase like the above can be in my research. Since the above is timed & dated, you know that I sent somethins about the same subject earlier to you. In evolutionary environmental conditionins this experience could be cross referenced to synchronous thousht in the mass mind, which can fall under the seneralized catesory of planet psycholosy. Now, to add somethins like the above messase under this particular way of recordins time by planetary location, one can see if there are any other cross refs. To set a bit far fetched...Juptr. Effct. = possible increase in ESP or PSIONICS..... and so on.

If you don't mind, I would like to keep this correspondense on these "odd" projects between you and me, and who ever is monitorins, as I am sure that a lot of people would not understand and mis-interpert. It would be better to have somethins all maped out in the form of a review rather than spendins a lot of time answerins questions. So.... since you have shared a lot of yourself I felt that I would share a little of myself.

73, Best to you and yours, -cas-

TO: HM
FROM: PLR
SENT: 09 DEC 81 17:25:20
READ: 10 DEC 81 08:28:50

FROM: Dave, K8MM0
TO: Hank, KA6M

1. Here I am again picking up my mail. Amazing, the same month also!

2. Am working on MODEM7 to pull off mail to disk. Now using MODEM2X which is outmoded already (5 months later only).

3. Just mailed WA2SNA/R from to Oakland, N.J. - Steve Robinson's gang. Implementing Hank Algorithm Repeater on TNC could seed these things all over coast.

4. IP header looks neat. Try to consider not redoing all the current LIPs and TIPs. Is there a way?

5. I like the ARPANET ROP (RADIO ON PACKET) idea. It goes along with dynamic routing so well. Am looking forward to more discussion like your 27 point blast. Could keep us thinking for weeks.

73,,,,Dave

I am standing here with Art Kleiner, research editor, "CoEvolution Quarterly" showing off the system. He would like to get in touch with you..... so .... I gave him your phone number and he is giving you his: (415) 332 1716..... and that is in Sausalito. He will be doing a short item on packet radio.

73, -ore-

FILE HANK_FROM_PACKET
RECORD FORMAT: D-S

The followins letter was mailed on 08-DEC-81 at 09:44:25.

From -cas-
To Hank
Date 08-Dec-81

Hank: Brian & I were talkins yesterday, and neither of us remembered to write down the calls of the people wishins to participate in the "packet steerins comittee". The only ones that we can remember are W6JHJ, N6ECT, KD6LI, Ensle, & Gnu. Can you help with the other three, and I can't remember if you, and I hope you are, soins to be a part of it as well. My reasons for settins this tosether are to initiate further communications with those concerned , around the country.
Also, until John (GNU) sets it tosether, via radio, I will dump his mail, and deliver it to him, deletins old files. We asreed on this last nisht, to help him save $$$$.
I would like to start coresponding with "Skip" and the K8MMO station to brins us more tosether, as I think that since most people are repeater oriented, it would be nice to so into Arizona, L.A., etc. At the same time I want to be conscious of "not puttins too many irons in the fire" or "too many cooks spoil the broth", so that we don't repeat ourselves too often. 73, have a sood week.... -cas-
Curtis

TO: HANK KA6M
FROM: ED WA6RZW

SUBJECT: SUCCESS

I'm happy to report the LIP/TIP software is now working on the Heath H-8. After many months of work, the last major obstacle has been overcome. At this point I don't see any major changes occuring in it. There will always be some minor chnages from time to time. I will now turn my efforts to polishing the code for the two programs that run in my host H-8. If you know of anyone interested in running packet in a Heath computer, or any other type of 8080/Z80 based system you might let them know it's available.

Ed WA6RZW
2110 PST 7 DEC 81
NNNNN

SENT: DEC. 7, 1981
TO: HOWARD/HANK
FROM: BRIAN

A couple of days ago I recieved an information packet from IBM concerning some new software releases, and thought you might be interested. The offerings are:

UCSD P-System with UCSD PASCAL	$625
UCSD P-System with FORTRAN 77	625
UCSD PASCAL compiler alone	175
FORTRAN-77 compiler alone	175
IBM Personal Computer FORTRAN compiler	350
IBM Personal Computer Macro Assembler	100
Typing Tutor (disk or cassete)	25
Arithmetic Games Set 1	60
Arithmetic Games Set 2	60
Fact Track	90
General Accounting by BPI Systems, Inc.	425

The UCSD software requires a minimum of 64K of main memory to run, while the IBM FORTRAN needs 128K. The assembler requires 96K and one disk drive, although there is a subset version on the same disk which will run on a 64K system, but without macros, repeat functions (REPT, IRP, IRPC), record pseudo-ops or structure pseudo-ops. All the other software will run in 64K or less and may require the use of the color graphics board (games). Most of the software will not be available until the first quarter of next year.

I finally recieved the ship date for the system that I ordered. I will not get it until April of next year. Oh, well...

Regards, Brian

TO: HM
FROM: PLR
SENT: 06 DEC 81 07:31:42
READ: 06 DEC 81 08:16:58

FROM: DAVE, K8MMO
TO: HANK, KA6M
SUBJ: INTERNET NODE IDEAS

1. JUST A QUICK ONE. WHAT IS WRONG WITH ASSIGNING SAY THE TOP FOUR (LESS OFFH) ADDRESSES OF EACH LAN MAGNUSKI REPEATER TO BE DYNAMICALLY USED BY THE INTERNET NODE. FOR INSTANCE, KE3Z REQUESTS CONNECTION THRU THE WALDORF MD. REPEATER WITH K8MMO WHO REALLY USES THE VIENNA REPEATER. THE INTERNET NODE IS ALWAYS LISTENING TO THE WALDORF MACHINE ON FREQ 144.93 AND THE VIENNA MACHINE ON 147.585. THE INTERNET COMPUTER HEARS THE REQUEST FOR CONNECTION WITH K8MMO, GRABS ONE OF THE TOP FOUR ADDRESSES (WHICHWVER ONE IS FREE NOW) OF THE VIENNA MACHINE AND REQUESTS CONNECTION WITH K8MMO. HE THEN GRABS ONE OF THE TOP FOUR ADDRESSES OF THE WALDORF MACHINE AND CONNECTS UP WITH KE3Z THUS PLAYING GATEWAY (WRONG TERM REALLY SINCE NO PROTOCOL CHANGE TAKES PLACE).

2. I THINK THE ONLY ADDRESS PROBLEM IS WHEN THE INTERNET MACHINE HEARS THE WALDORF MACHINE (RITS 6 AND 7 HIGH) HE MUST STRIP BIT 6 SINCE OUR REPEATERS WONT REPEAT ANOTHER REPEATER IN THE SAME ADDRESS RANGE. AND THE SAME WHEN HE HEARS THE VIENNA MACHINE OUTPUT. IT MAY WORK.

3. I DIDNT WANT TO DO THE SIMPLE TRICK OF JUST ADDRESSING THE WALDORF MACHINE WITH BIT 7 AND 5 LIKE YALL DID; THAT WOULD ALLOW INSTANT INTERCONNECT AND WE COULD SHARE THE SAME FREQ BUT WOULDNT LET ME PLAY WITH THESE NEW INTERNET IDEAS.

4. LAST QUESTION. DO WE CONSIDER THE INTERNET MACHINE A STATION NODE? I GUESS SINCE IT USES DYNAMIC ADDRESSING, KNOWS WHERE THE LANS ARE AND HOW THEY ARE ADDRESSED. I GUESS MY REAL PROBLEM IS HOW DOES THE INTERNET MACHINE KNOW K8MMO IS ON THE VIENNA MACHINE AND NOT THE WALDORF MACHINE? HE COULD NOT KNOW AND WHEN K8MMO DOESNT ANSWER UP ON THE WALDORF MACHINE JUST TRY VIENNA. WHEN I BOUNCED OFF THAT IDEA AROUND HERE I GOT A RASPBERRY.

73...DAVE

TO: HM
FROM: PLR
SENT: 05 DEC 81 18:52:01
READ: 05 DEC 81 19:38:30

FROM: DAVE,K8MMO
TO: HANK,KA6M
SUBJ: LATEST NEWS FROM WAS

1. MAGNUSKI STYLE REPEATER ON THE AIR ON FREQ 147.585. PROGRAM WRITTEN BY JON BLOOM, KE3Z RUNS AT 0000H ON TNC BOARD AND IS ABOUT 1K LONG (DEPENDS ON HOW MUCH TEXT IN BEACON PACKET). WE TESTED IT OUT IN MY BASEMENT OVER THE PACKET LINK DOWN HERE AND IT WORKS SUPER EXCEPT:
A. WE NOTED THE TNC BOARD WILL OUTPUT MORE THAN 8 PACKETS WITHOUT GETTING AN ACK. AFTER I THOUGHT ABOUT IT A FEW DAYS, IT OCCURRED TO ME WE WERE IN MONITOR MODE ON THE WORKBENCH "USER". CONNECTED MODE WOULD PROBABLY WORK FINE. WE LIMITED OUR REPEATED PACKETS TO 8 IAW THE MAGNUSKI ALGORITHM.
B. WANT TO LINK TWO OF THESE MACHINES. CAN NOT FIGURE OUT NEAT SCHEME. SECOND MACHINE (FREQ UNDETERMINED BUT PROBABLY IN 144.5-145.5 RANGE) WILL AT MY TRAILER IN MARYLAND UP BY THE NRL MICROWAVE FACILITY. THEN I CAN SIT HERE IN STERLING, PARK AND PLAY INTERNET (OR SOMETHING).

2. WE TALKED WITH PERSON WORKING AT TELCOM (FRIEND OF DR. SUDING) AND HE SAYS BEWARE OF ANY 8273 WITH DATE CODE BEFORE 8050. OUR CHIPS ARE OK AS MOST IN 8110 AND ABOVE RANGE. PROBLEM IS THEY SLIP OUT OF BUFFERRED MODE ON THEIR OWN. IF WE FIND ANY OF THESE GEMS ON OUR LOCAL AREA NET, WE ARE SAVING THEM FOR REPEATERS SINCE OUR SOFTWARE DOESNT CALL FOR BUFFERRED MODE.

3. HAVE NOTED THAT ON THE WORKBENCH "USER" THAT IF I WAVE THE IC?AT AROUND THE TNC, AND A PACKET IS TRANSMITTED, RF BOTHERS THE TNC TO THE POINT THAT IT FOREVER PACKETS. THINK THAT IS CAUSE OF THAT PROBLEM AND WE HAVE PUT THE WORD OUT TO SHIELD YOUR BOARD.

4. WE NEED MORE TNC BOARDS. I SOLD ALL 15 OF THE ONES SHIPPED TO US FOR THE CONFERENCE. MONEY FOR YOUR 6 CHIP SETS ON THE WAY TOMORROW (MONDAY REALLY). MONEY FOR THE 15 BOARDS IS A PROBLEM FOR ME. WHERE DO I SEND IT? GUYS IN LA REPORT THAT RONDEAU STREET ADDRESS NO LONGER VALID. READING MY MAIL TONIGHT, MAYBE JOHN SPRAGGS IS BEST ANSWER. REAL PROBLEM IS WE HAVE NEW JERSEY ORDER FOR 14 MORE BOARDS (ALREADY SHIPPED 5 UP THERE AND THEY EAT THEM FOR LUNCH OR SOMETHING). THINK WE SHOULD START TURNING THEM OUT. I WILL SHIP A CHECK TO SPRAGGS AND HOPE FOR THE BEST.

5. HI TO CURTIS, N6ECT. GLAD TO START DIALOG WITH USERS ON WEST COAST. WE HAVE FOLLOWING UP HERE:
W4RI WB4JFI W4CQI W4MIB W3IWI KE3Z AND REPEATER IS WB5MMB WHO JUST REPEATS.
I THINK W3IWI STILL NEEDS A MODEM, OTHER PEOPLE ARE UP AND RUNNING. NEW JERSEY GANG HAS COME UP WITH SOME GENERAL DATACOM MODEMS AT 25 DOLLARS. I AM GETTING SOME TO KEEP AROUND FOR NEW USERS.

6. TERRY, WB4JFI HAS CONSTRUCTED AN S100, DUAL 8273 BOARD USING THE AM9519 UNIVERSAL INTERRUPT CONTROLLER CHIP. HE IS DEBUGGING IT NOW AND JON, KE3Z IS GOING TO PROGRAM IT. I AM BUILDING A STD BUS SYSTEM AND EXPECT TO TRY A STATION NODE WITH IT. WE ARE ALL WAFFELING AROUND TRYING TO FIGURE OUT WHAT SOFTWARE TO PUT IN IT, BUT IT WILL BE SOON.

7. I AM LOOKING FOR A SOFTWARE PROJECT AND THINK I WILL DO A LOGGING

NODE USING TNC BOARD. I THINK WE SHOULD DEVELOP AS MUCH SOFTWARE FOR THE TNC BOARD AS POSSIBLE. I USE TEXTOOL ZIF SOCKETS ON MY PROMS HOWEVER AS I RUINED A SET OF RADIO SHACK SOCKETS.

8. WE ARE CONDUCTING DIALOG WITH DEN CONNERS WHOM WE MET AT THE CONFERENCE. HE IS IN PHOENIX AREA AND GANG THERE ARE MAKING A NEW TNC BOARD WITH 6502 MICRO AND 8273 HDLC CHIP. THEY HAVE BEEN READING THE INTERNET SPEC FROM NBS AND THINK NBS HAS DONE A GOOD JOB OF CHOPPING OUT THE MILITARY STUFF FROM THE ARPANET INTERNET SCHEME. WILL HAVE TO LOOK AT IT CLOSELY. WE ARE GOING TO BE TALKING TO DEN ON 20M HF ON WEDNESDAYS AT 2000 LOCAL TIME I BELIEVE.

9. I HAVE JUST ABOUT TALKED TERRY (OUR HARDWARE BUILDER) INTO DOING A NEW TNC BOARD AFTER HE FINISHES HIS CURRENT S100 PROJECT. WE CAN DIRECT OUR ENERGYS ELSEWHERE IF SOMEONE IN STATES (SHORT TURNAROUND TIME IS WHAT WE ARE AFTER) WANTS TO BUILD THEM. COMPLETE KIT DELIVERED IN SEVERAL DAYS WILL GET A LOT OF NEW PEOPLE ON THE AIR. BOARD BARE SHOULD STILL BE AVAIL FOR BUILDER TYPES ALTHOUGH HANK CHIP SET SEEMS ESSENTIAL TO PROBLEM.

10. I PROMISE TO READ MY MAIL MORE OFTEN (IT IS A CABLE PROBLEM. WITH TWO TNC BOARDS AND TWO TERMINALS, MUST UNPLUG TO MODEM ETC.) AND WILL LOOK FOR SF NEWS. I WILL NEED MORE CHIP SETS TO DISPENSE AFTER YOU RECEIVE MY LATEST CHECK. SEND AS MANY AS YOU FEEL OK CONSIGNING TO WAS.

73 FROM DAVE

Date: 04 Dec 81

From: Curtis
To: Hank

Re: Packet MiniBBS

I received the below message and checked it out. If you want to spend a few dollars on a phone call it might be interesting.

THERE IS A NEW RCP/M - MINIBBS ON LINE IN PALOS VERDES, CA AT (213) 541-2503. PACKET RADIO IS A SPECIAL INTEREST AND SEVERAL PACKET RADIO PROGRAMS ARE ON LINE FOR DOWNLOADING.
THIS BBS IS PART OF THE 145.36 COMPUTER REPEATER IN THE L.A. AREA, AND WILL BE MULTIPORT ACCESS IN THE NEAR FUTURE. WE ARE INTERESTED IN POSSIBLY PUTTING UP A PACKET REPEATER NETWORK HERE IN THE L.A. AREA AND WOULD LIKE TO HEAR FROM ANYONE INTERESTED IN TRYING TO LINK INTO THE L.A. AREA ON 2 METERS OR 420 MHZ. ONE POSSIBLE SITE HAS BEEN WORKED FROM THE GROUND AT FRESNO ON TWO METERS WITH 25 WATTS, ALSO USABLE FROM LAS VEGAS, KINGMAN AZ., AND THE MOUNTAINS AROUND PHOENIX.

DE SKIP WB6YMH

Date: 02 DEC 81

To: Hank, KA6M

From: -cas-, N6ECT

Re: Calls lossed on KA6M**, PACKET CENTRAL ---- November 1981

There were 305 calls lossed on KA6M** 244 calls via packet radio
61 calls via telephone

These calls were made by 21 various stations/persons.
!!!!!correction!!!!!!! 22 various stations/persons.

N6ECT	KA6M	WA6RZW	W6JHJ	KD6LI	WB6SDE	KA6NAN	KN6W	W9DHK
WA4DNB	W6NUX	W6LLO	W6CB	W6RAW	K6HWJ	N6FLQ	K6HSV	VE7CYP
WA6SLF	WA4DNB	ENGLE	GNU					

90% of the calls lossed were made by 8 stations.
ENGLE KA6NAN WB6SDE KD6LI W6JHJ WA6RZW KA6M N6ECT

73, -cas-

TO: HM
FROM: DML
SENT: 03 DEC 81 19:58:05
READ: 03 DEC 81 20:51:38

Hank,

Your points are well taken. It is especially true that advice from users is necessary as there still is no local network activity for me to draw on. We are going to change that situation as soon as possible.

Cost and speed are the main disadvantages of the 8273, but you are correct in your concern for the software. I would like to get Doug's opinion on this before making any mental commitment as it will likely be him that would have to add the changes. My hope is that the differences are fairly localized in the code. When I get the Lif listing printed out I will have a look.

The deuce chip is a pair of 8250's but gives up several of the modem lines to do so. My WD manual is at work, so I will have to check the parts out later.

The latest on our assembly of kit parts is $2 US for a crystal. The quote was for 3 lots of 25 so we may even get a better price if we add in another 100. Is your source of 8250's and 8273s still good? It seems I have committed myself, if not the club to financing a run of 100 kits. I am getting desperate about kicking our network off! Would a quantity purchase get the cost below $46.50 for the 2 chips?

Don was just talking to Bob who says he hasn't been shipping right away because of difficulty in getting to UPS before they close in the evening. We have asked him to assemble the boards in smaller packages and mail them, regardless of the extra cost. Since he should be mailing your latest latest order today, it may not be long until you get them. We'll see.

The PCB people had six boards left in inventory that they hadn't told us about so it may tide us over until the new order arrives.

That's enough for now, cu

John S. VE7ADE

Date: 02 December 1981
To: Hank Magnuski
From: David Ensle

Here is the list of my thoughts on the complication of a PRNet.
This is from my notes at the AMRAD conference, better late than never.

This is a list of items concerning the set up and configuration and addressing issues in Packet Radio Networks for Radio Amateurs. The following list is a collection of thoughts in the order in which they occurred; there may be no logical flow.

Note: This set of comments assumes a single frequency repeater.

1. There may be multiple nets on a single frequency. The repeater may be there but 2 users may choose to utilize direct connections rather than utilize a repeater.

2. Any one node (or station) may wish to have simultaneous membership in several nets, i.e. several of the nets on that one frequency.

3. The Local Area Nets for packet radio should be viewed as a communication mechanism for now. Other issues such as routing algorithms, resource sharing, etc. should be allowed for and allowed to be incorporated into a PRNet but are not the driving issue at this time and should be noted and put aside for later investigation.

4. In contrast to #3 above however, we should accept standards as they are agreed upon. We should start at levels of agreement wherever they may occur.

5. Routing algorithms should not require knowledge of any particular net's existence.

6. Hank Magnuski's idea about latitude and longitude specification on the part of the originator should be sufficient to cause the packet to be received at the intended node.

7. PRNs will be dynamically fluctuating -- in size, existence, and location.

8. Individual PRNet nodes should have minimal needs placed on them. Protocol and control (including addressing) should be implementable in a single microprocessor, Receive to transmit switching should be relatively non-sophisticated, it should only check to see if the channel is not busy before making the transition.

9. Users of a PRNet will give little regard to geographical displacement of nodes they are communicating with.

10. Users should be able to round-table in a PRNet. This places the requirement that: any communication set up should not be explicitly exclusive of other communications. (this leaves open the selection of such exclusiveness by the node if he so desires.)

11. Users should be allowed freedom of entry to nets without time displaced prior coordination or assignment, i.e., no hardware selected address

strapping or blasted PROMS.

12. General broadcast provisions should be provided for.
This brings up some interesting problems when allowing
what amounts to a CQ, they are:
Do you allow CQ by specific nets?
by subject?
by lat & long?
How do you control the area covered: by expanding or contracting
if this option is selected?
If this is allowed how do you keep from interfering with ongoing traffic
throughput, do you reserve a time slot for CQs?

13. How do you handle a geographically dispersed subject matter net?
By time slotted CQs?

14. How does a node find out what nets are available?
Check into a central facility to find out? Where is central?
Freedom of assignment makes assignment/deassignment difficult.
This function should probably be reserved for sophisticated nodes.
i.e. nodes with lots of cpu power. Maybe some kind of node run
by a central coordinating committee. This might be OK as the info
giver may not be required for healthy running of the PRNet.

to: Hank Magnuski
from: David Engle

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A lot of these items may duplicate Hank Magnuski's ideas.
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Date: 02 DEC 81

To: Hank, KA6M

From: -cas-, N6ECT

Re: Calls logged on KA6M**, PACKET CENTRAL --- November 1981

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61 calls via telephone

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::::::correction::::::: 22 various stations/persons.

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WA6SLF	WA4DNB	ENGLE	GNU					

90% of the calls logged were made by 8 stations.
ENGLE KA6NAN WB6SDE KD6LI W6JHJ WA6RZW KA6M N6ECT

73, -cas-

Date: 02 December 81
To: John Sprasss
From: Hank
Re: VADCG TNC

I think it would be very helpful to all if you would solicit a "wish-list" for improvements to the TNC. Everybody has some favorite option he wants, and some simple but very useful improvements misht overlooked by a desisner if input from outside is not used. I will ask our net members for their comments.

As far as I know, the Western Disital 1933 is the only other HDLC chip with NRZI/DPLL. Departure from usins the INTEL 8273 would have some serious software support and development implications and should not be taken lightly. I don't think I could endorse use of another chip at the present time unless there were other overridins factors.

73, Hank

TO: HM
FROM: LSK
SENT: 02 DEC 81 07:39:59
READ: 02 DEC 81 09:16:09

HANK KA6M
JOHN VE7ADE
WE** BOTH OF YOU GUY'S DON'T *IKE MY
'*'S. OK WE** WHEN YOU START WITH A
COMP*ETE*Y HOME MADE SYSTEM YOU WONDER
WERE THE '* YOU ARE COMING FROM.
T*E BUGGER
FOR A FEW DAYS NOW WONDERING WHERE
IT WAS COMING FROM. NOW IN THE NEXT
FEW DAYS I WI** REPROGRAM THE KEYBOARD
EPROM AND THEN THE * WI** BECOME A BIG *
AND WE WI** A** BE HAPPY.
THANK YOU BOTH FOR BRINGING IT TO
MY ATTENTION. CU*
DE *ARRY, VE3QB

TO: HM
FROM: DML
SENT: 01 DEC 81 21:04:12
READ: 02 DEC 81 09:15:34

Larry,
Sorry to hear about your cold. Will it feel any better if I tell you that I caught one at exactly the same time and Bob is home with one as well? His is well developed, so maybe we can blame ours on him, Hi!
Got your message and left one for you. To repeat; your orange sends 1 instead
The call is VE7ADE and the name is A. John Strauss.
6816 Kerr St.
Vancouver, B.C.
V5S 3C8
Home 604 438 8587
Work 294 0414 231
ABBS 437 7001

My current efforts are directed toward any thing that will get a network in Vancouver past critical mass so it can perpetuate itself by word of mouth and a new version of the TNC board that will be up to date and provide max flexibility so it can be used effectiely as a tnc, link, host interface, etc.
What I most need is to find an 8273 replacement for our async HDLC mode, so I will be checking out all the comm. chips available.

Did -cas- send you a copy of the price list? We have ordered enough for 100 boards. If we get complete kits made up, a populated board might be sold for $150 Can.
We are also planning to include pre programming of the Eproms.
Anyways, cul
John S.

[UDD]HANK]Z80]KA6M_FM_VE7ADE.02 2-DEC-81 9:59:37

TO: HM
FROM: OML
SENT: 01 DEC 81 21:04:12
READ: 02 DEC 81 09:15:34

Larry,
Sorry to hear about your cold. Will it feel any better if I tell you that I caught one at exactly the same time and Bob is home with one as well? His is well developed, so maybe we can blame ours on him, Hi!
Got your message and left one for you. To repeat; your orange sends J instead
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Anyways, cul
Jean S.

I found somethins that you misht want to add to your files on the STD bus. New 7911/QMB-16 is a motherboard/backplane card desisned for hish quality signal bussins in STD Bus systems. The 16 slot card features extensive shieldins of the signal runs throush the use of interlaced sround plane and plated-thru holes. Each signal line is terminated with a special RC network to reduce the bus rinsins prevalant in multi-card microprocessor systems. write... Matrix Corp., 1639 Green St., Raleish, NC 27603.
73, -cas-

.el .sk1
.lm 0
.rm 80
.pl 1000
.pn 2
.tt
Local Area Network Design Issues
.sk 3
.nf
Date: 30 November 1981
To: All packet stations
From: Hank Magnuski, KA6M

Subject: Local Area Network Design Issues

The following is a random collection of requirements and design issues related to the construction of a local area network. Some of the ideas are very preliminary and some of the requirements may conflict with each other.

This is a set of notes and should not be taken as a well thought out discourse.

1. We must consider the situation where there are multiple repeaters on the same frequency with overlapping RF domains. Some stations may be able to access all, others just one.

2. No single Control Station should be "in charge" of the operation of the other repeaters. They all act as fairly independent entities.

3. Users stations ought to be able to move into an area and setup and start transmitting without any prearranged address assignment or placement on a polling list.

4. The long term solution will not depend on unique, permanent assignment of HDLC addresses to users. The callsign is the only item that is really important.

5. Users should have some control over which repeater they wish to access, and whether to use a repeater at all.

6. Direct connections between stations must be permitted.

7. Target stations (of a connect) should automatically adjust their output to return packets via the repeater/non-repeater path initiated by the connecting station.

8. If the connection is direct or through just one repeater, the protocol could be simplified and overhead bytes could be eliminated. The Internet Protocol (IP) header would not be needed.

9. If two or more repeaters are in the chain, IP headers will most likely be necessary, but possibly one could arrange a connection through a limited or well defined path without use of the IP header.

10. Repeaters should be available for status checks, loopback testing and diagnostics. Thus there will be packets or commands directed to the repeater which are intended for processing by the repeater.

11. Maybe a repeater should implement "please-repeat-me/don't-repeat-me" status bits for each user address available. Users should be able to selectively address or access each machine or network server. A "please-repeat-me" directed to one machine should be interpreted as "don't

repeat-me" by other machines.

12. Repeaters will send "Repeater-ON" status message and current routing information to other repeaters in the network.

13. Hop-by-hop error checking would provide satisfactory reliability for the proposed datagram implementation.

14. Static assignment of HDLC addresses would be ok for permanent stations like repeaters or other network servers.

15. No static assignment of addresses implies:
    a.) Dynamic assignment is required -or-
    b.) Use of IP headers is required everywhere

16. Dynamic assignment of addresses implies:
    a.) All servers covering one area are coordinated and don't assign the same address to different users.
    b.) Deassignment of addresses must be foolproof and implemented through user-initiated commands or through timeouts. No conditions should permit an address to "lock-up" to a non-existent or inactive station.

17. Use of IP headers implies:
    a.) More overhead per packet, approx. 30-40 bytes.
    b.) Only one HDLC address code is required for all users.
    c.) From and To callsigns will be in each packet.
    d.) From and To network node address will be in each packet.
    e.) Other useful info in header, such as protocol type field.

18. Some block of HDLC addresses should be reserved for network usage and servers. Here is one proposal for assignments:

00	Maintenance or NOP address
01-7F	Direct connect for stations not using IP protocol headers
80	Reserved
80-EF	Repeater connection for stations not using IP protocol headers
F0-FD	Network repeaters, servers and gateways using IP headers
FE	User station common calling address, IP headers in use
FF	Broadcast, all-parties-addressed, no IP headers

19. If repeater with address F9 receives a packet from machine F1, it would look into its routing tables and find the next repeater which should receive the packet, say FC. It would put FC into the outgoing address, and retransmit the packet. Thus we utilize selective addressing and can aim the packet in the direction we want, based on our routing decision.

20. In addition to the address ranges, we have control over the type of packet sent as defined in the HDLC control field. What use should be made of Non-Sequenced-Information (NSI) field packets (and other types)?

21. Protocol should allow host machines to simultaneously handle multiple connections with different users.

22. What requirements do real-time broadcast protocols impose on the design?

23. Summary of various cases:

I. Direct	A -> B
II. Single Repeat	A -> R1 -> B or A -> Rn -> B
III.Double Repeat	A -> R1 -> R2 -> B

IV. Linkins A -> R1 -> R2 -> ... Rn ... -> B
V. Repeater Command A -> R1 -> A
VI. Broadcast A -> Rn -> B, C, D, E, ...

24. A repeater can be addressed in several different ways:

Use of its own callsign in an IP header
Use of its network node address in the IP header
Use of its own special FO-FD address.

25. Various classes of packets which a repeater will have to handle:

a.) IP packet with FO-FD address, "To" Node is repeater's.
b.) IP packet with FO-FD address, "To" Node is not repeater's.
c.) IP packet with FO-FD address, "To" Node & Call is repeater's.
d.) IP packet with FE address, "To" Node is not repeater's.
e.) IP packet with FE address, "To" Node is repeater's.
f.) IP packet with FE address, "To" Node & Call is repeater's.
g.) IP packet with FE address, "From" Node is repeater's.
h.) NSI packet, an FO-FD address, with command or control text.

The corresponding situations are these:

a.) Repeater is last or only link in a linked chain
b.) Repeater is a middle link in a linked chain
c.) Repeater itself is the final target of the packet
d.) Packet is for another server, unless case g below.
e.) Repeater is last or only link in a linked chain
f.) Repeater itself is the final target of the packet
g.) Repeater is a beginning link in a linked chain
h.) Repeater itself is the final target of the packet

26. For a station to automatically return a packet over the path on which it came, the following steps are necessary (IP protocol is assumed):

a.) Exchange source & destination node numbers
b.) Receive and transmit using standard FE calling address.

The repeater (or non-repeater) which delivered the packet will automatically pick it up and retrace the path.

27. Direct connect stations using IP protocol can use "NET 00 00 00" as the network node address. NET is decimal 44.

To : Hank, KA6M

From: Curtis, N6ECT

Yesterday, Dave, W6RAW and I had an interesting discussion of the possibilities of constructing a weekly net. It was suggested that there be a control station (net control), with a list of users. The control station would then try to connect to each station on the list, record any traffic plus the log-in, disconnect and call the next station on the list. At the end of the list, the control station would then re-connect to the first station called, and upload to that station, all correspondence recorded on disk, disconnect, call the next station that checked in, and repeat the sequence, until the end of the list of call-ins. At this point each station could handle traffic, if any, with other stations, etc., end of net. We agreed that with an increase of users, that this system would become a "white elephant" and that there would have to be something to replace it. We also agreed that this could possibly interest other users to the point of becoming involved in this aspect of packet radio, and a new and better design for this type of networking would manifest. Dave, at this point sent me a portion of our conversation back that he had recorded on disk, which took very little time, thus verifing what we had discussed.
Before we could try another experiment, Dave had to QRT so I thought that I would ask you about this alternative.

Lets say that there are 6 repeaters (number is not important at this time).
#1 is located in the North Bay
#2 is located in the North East Bay
#3 is located in the North West Bay
#4 is located in the South East Bay
#5 is located in the South West Bay
#6 is located in the South Bay
Lets say that they are all repeating 146.580.

My question is: Would the above steps for handling a net be obsolete, due to the many repeaters repeating input, which could possibly be copied by all stations concerned, thus eliminating the need to check-in with every station as mentioned above? If it is possible, then the possibilities of fast, smooth running net could be initiated and the group effort carried on.

I think that there would be an interest in this subject, seeing that the last scheduled seminar for this year is in a few days, and the attendence at the seminars has been very good.

Just a thought.

73, Curtis, N6ECT

TO: HM
FROM: DML
SENT: 29 NOV 81 22:40:26
READ: 30 NOV 81 13:25:16

Hank,
It was the November BYTE, Clubs and Newsletters. Just a short blurb on us although a little dated as I submitted it in February, I think.

If that distributor checks out, we are planning to place an order on him for several thousand dollars, although most of that will be for another group of computer enthusiasts at work in whom I have also developed some interest in packet communications. Unfortunately as is often the case most of them don't have licences and while our Digital non-code exam might suit them best, we haven't got anyone to teach a class.

Do you know of any good clock recovery circuits that might be used to achieve the same results as the DPLL in the 8273? I have been looking to see if such a circuit might be available, such as those used for data recovery for disk controllers.
If we could locate an inexpensive one that worked with the NRZI format, we might save by using a Z-80/SIO. That would give us two HDLC ports and higher speed capability for linking repeaters.
Since that would be a high volume application, I think it would benefit best from a single board approach. If we put room on such a board for Byte-wide memories and used a dual 8250 (DEUCE) and SIO it should be quite versatile and useful as a general purpose node, including TNC.

Can you tell me how your TIPM03 is working out as we would like to distribute it as the latest version of the TIP. If anyone is adding features, I think one of the most useful might be an Auto-Baud function.
Looking at the M03, I see it still isn't quite data transparent and as such is only less hazardous to use for random data like object code or any non-ASCII code. Perhaps the best way to utilize the data transparency of the HDLC would be to use a physical switch on the TNC.
This could be one of the spare data inputs on the 8273 or 8250. Of course it could also be manipulated by a host computer for automatic functions.

Enough ramblings, CUL
John S.

Date: 30 Nov 81
From: H Magnuski
To: John S.

1. I think you need more than just a DPLL to use a Z80/SIO. It is one of the few HDLC chips that does not have NRZI encode/decode functions. I don't know of any bit to set to put it into an NRZI mode. I don't have any DPLL circuit either, and would like to find one as well.

2. The TIPM program requires the LIPM program, and we are quite happy with the current release, but have not yet reconciled it with all of Doug's latest patches. Some of the buss were found here, and we fixed it in a different way.

3. The TIPM03 is totally data transparent. It is assumed that the sender scans for the special escape character ^^, and doubles it whenever he finds it. I don't know quite what you mean by "slightly less hazardous."
As far as I can tell, arbitrary binary data should be handled by this code, in both directions. Please tell me where you see any discrepancies.

4. I can send you the LIFM over this link if you want it. Did I send you TIPM03 already? I can't remember. We would be very happy to have you adopt these versions of LIP and TIP.

73, Hank

Date: 30 Nov 81
From: Hank
To: Curtis

Well you brins up a number of interestins points that need to be discussed. Yes, I agree there is some type of need for a NET or NET-like activity on this system. My questions are these:

1. Does it have to be in realtime?
2. Would a continuins computer conference be just as sood?
3. What happens to people that can't make the real-time session?
4. Does anybody have the time to sit around for lons periods of time while someone types in his solden words? (I certainly don't have that time.)
5. We have no way of handlins real-time broadcast protocols, and need some proposals in this area, or at least, some delimitins of the issues.
6. Would it have to be limited just to this area?
7. What can you tell us from your experience with the Conference Tree system which is pretty close to a sood computer conferencins system (but lacks thinss like individualized pointers to current places in text).
8. Who wants to do the prosrammins?

I'm all for it.

73, Hank

To: All Bay Area Packet Radio Users and Interested Persons

From: Hank Magnuski, KA6M, 415-854-1927

Subject: Packet Radio Seminar for December

Date: Dec. 1st, 1981 (Tuesday), 8 pm Local Network Design

Place: Tymnet Training Room
Tymnet, Inc.
20665 Valley Green Drive
Cupertino, CA 95014
408-446-7190 (William Putney, WB6RFW)

Directions: Take 280 to DeAnza Blvd. exit. South on DeAnza to Valley Green Drive. Right (west) on to Valley Green to first 2 story building. Entrance on east end. DeAnza Blvd. once was Sunnyvale-Saratoga Road.

The December meeting will complete the initial series and will be the last meeting for this year. Future plans will be discussed at this meeting.

The main topic for discussion will concern design issues related to software and services for our planned local area network. There are some important problems which have to be worked out in order to build a multi-repeater system.

From: Curtis, N6ECT
To: Hank, KA6M

The followins letter was mailed on 24-NOV-81 at 21:42:57.

Since 01Nov81 @ 10:02:35 until 24Nov81 10:09:55 there have been 237 calls lossed on KA6M**. 197 calls have been made via packet radio and 40 calls have been made by telephone. The calls were made by 19 various stations/ persons, and 87% of the calls lossed were made by 6 stations/persons.

But the DG probably has this all figured out anyway, but I thought that you misht be interested.

73, -cas-

I received the followins information today, which you misht want to pass on to our brothers in Canada.

MICROWARE EXCELTEK
176 Valleyview Way
South San Francisco, California 94080
U.S.A.
(415) 872-2195 Telex 172029 SPX SRFL

PRIME IC'S FOR SALE NOV. 1981

100% GUARANTEED !

EPROMS (450N.S.)

2708	MOT	$1.75
2716	INTEL	2.35 (550N.S.)
2732	INTEL	6.50
2732	NEC	6.50
2532	HIT	6.50
2764-250	INTEL	27.50 *
2716	INTEL	3.15

STATIC RAMS

2111A-4	AMD	.85
21L02A	SYT	.65
2114N-3	NS	1.00
6116P-150	HIT	6.90
6116P-200	HIT	6.50
2114AL-200	INT	1.50
4044-250	TI	1.25
2115AL	INTEL	1.90

DYNAMIC RAMS

4027-250	TI	1.00
4116-250	TI	.95
4116-150	NEC	1.20
2117-200	INTEL	1.25
4164-150	MIT	6.95
4116-200	NEC	1.10

CMOS

MC14013BCP	MOT	.25
MC14538BCP	MOT	.59
MC14093BCP	MOT	.25
MC14160BCP	MOT	.52
74C160BCN	MOT	.52
MC14569BCP	MOT	1.50 *

C P U'S & SUPPORT CHIPS

Z80CPU	SGS	$2.75
Z80ACPU	SGS	2.95
Z80ACTC	SGS	2.95
Z80APIO	SGS	2.95
Z80ASIO/O	SGS	11.95 *
Z80ADMA	SGS	10.95 *

P8080A	AMD	.95
D8080A(cer)	AMD	1.59
P8080A	INT	1.25
D8085A	INT	2.85
P8255A	INT	2.30
P8216	AMD	.90
P8216	INT	1.00
P8226	INTEL	1.00
P8259A	INT	3.10
82S17	SIG	1.60
6502	SYT	3.65

74LSXXN

74LS00	TI	.20
74LS02	TI	.20
04	TI,NS	.20
08	TI,NS	.20
20	TI,NS	.20
37N	FSC	.20
74	HIT,NS	.22
138	NS,TI	.32
161N	NS	.42
241	FSC	.25

LINEARS

NE555P	TI	.35
LM1877	NS	.95
LM101AH	FSC	.95

Prices for 1K pcs. up except denoted by * (100 pcs. up)
Please call for the latest quantity pricing

I hope that this information will be helpful to all concerned.

73, Curtis, N6ECT

TO: HANK
FROM: -cas-

I called Microware Exeltek about the chips that were mentioned in John S. or Doug's letter. The prices that were mentioned were correct, and I am having a price sheet sent to me. The chips are Intel, and I will bring the literature to the seminar with me. The only thing that I couldn't tell was the integrity level, based on a phone call. (HaHa)!

Hope you had a nice holiday and no indigestion today.

73, Curtis

TO: HM
FROM: DML
SENT: 27 NOV 81 00:01:55
READ: 27 NOV 81 08:44:02

Hank,

I have come across a company called Microware Exeltek which is offering 'prime IC's' for very low prices.
They are located at 176 Valleyview Way in So. S.F. 872-2195.

For example:

2708 $1.75
2716 2.35
2114 1.00
8085 2.85

etc.

We were wondering if you knew of them or could verify their integrity. These are meant to be 100-1000 lot prices which they say can be mixed types.

We might consider getting involved in a new group/kit purchase if these are real. Any chance you know of better prices?

We are all sold out of the last batch of boards and had to get another hundred on order right away. I don't think we ever said we would be getting out of supplying the boards. Our idea was that groups like yourselves might as well have a local supply that could be used to generate funds and encourage extra effort in getting more people on the air.

Orders are coming so fast right now, due to the QST and Byte mentions of our address, that it may not be too long before these hundred are gone as well. Isn't publicity wonderful? Don't know how long before the crest will occur, but it's about two a day, right now.

It is beginning to appear that our friend in Bellingham is not getting done promptly. Sorry about it. We have always asked if it was an imposition and he said it was no problem. However...

We will make other arrangements if necessary.

Larry is in town this week on business and we got our heads together for a little while at least.

CU 73
John S.

[Does anybody know the place mentioned? Would someone like to check it out and send me a report?? -- Hank]

TO: HM
FROM: DML
SENT: 26 NOV 81 19:34:57
READ: 27 NOV 81 08:43:38

Dear Hank,

I have now got my system going and am almost settled in my new QTH here in Toronto. I do not have any antennas up yet but plan to get a 2 metre antenna up soon. Here is my new address:

29 Shamokin Dr.
Don Mills, Ont. M3A 3H7

My home phone number is (416) 441-2417 and my work number is (416) 443-3764 but you will have to ask for me if you call.

I am renting a three-bedroom house close to where I am working.

I saw your update to the LIP program to change the channel-sharing protocol and random delay values. That is a change I was planning to work on myself. I am glad you got the time to do it. Keep up the good work.

73, Doug, VE7APU/3

**

2676W

ALFRED B. CHAN
898 CABOT LANE
FOSTER CITY, CA 94404

(415) 876-4145 BUS.
(415) 574-3048 RES.

NOV. 27, 1981

DR. H. S. MAGNUSKI, KA6M
2452 EMBARCADERO WAY,
PALO ALTO, CA 94303

DEAR HANK:

THANK YOU FOR THE INFO ON THE PACKET. I HAVE THE ALTAIR (MITS INC. WITH AN 8080A MICROPROCESSOR) AND A COUPLE OF DISK DRIVES, AND I WOULD LIKE TO EXPERIMENT WITH HARDWARE AND SOFTWARE.

ON PAGE 6 YOU SAID, "AS SOON AS A PACKET IS RECEIVED THE FRAME CHECK SEQUENCE (FCS) FIELD IS CHECKED, AND IF NOT CORRECT, THE PACKET IS DISCARDED."

WOULD YOU LET ME KNOW HOW THE FCS IS CALCULATED? IS IT A SIMPLE SUMCHECK (ADDING ALL BITS IN DATA FIELD), OR IS IT POLYNOMIAL. IF IT IS THE LATTER, WHERE CAN I OBTAIN AN ASSEMBLY LANGUAGE SOURCE LISTING OF THE ROUTINE (FOR 8080A)?

THANKS AGAIN, I FOUND YOUR PACKET VERY INTERESTING.

SINCERELY,

ALFRED B. CHAN, W6DNT
898 CABOT LANE, FOSTER CITY, CA 94404
HOME: 415-574-3048 OFFICE: 415-876-4145 (UAL)

** P.S. At present, I'm not interested in duplicating the repeater. I just want to know the FCS so my packets will not be discarded by your repeater. 73

Replied 12-4

Date: 26 Nov 81
To: Dave Borden
Fm: Hank Magnuski

1. Happy Thankssiving!

2. My notes say you owe me for 6 chip sets. Of the 10 sets on consignment, you sold 4 at the conference (2 to Steve and 2 to others) and I left you with 6 units. I'm glad to see that you've moved the material so quickly.

3. I have the original VADCG artwork here, and could make duplicate boards at any time. I've been holding off because I didn't want to stick Don Oliver with a lot of extra inventory, and also wasn't sure how soon our STD design would come along. It sounds like his inventory is moving quickly, and the STD has moved slowly, so maybe it would be wise to order more here. Let me know what you think. Delivery, indeed, is awful.

4. Not much else new here. Recently my time has been used up helping Polish refugees find jobs, and I haven't made much progress in programming.

73, Hank

FILE HANK_FROM_PACKET
RECORD FORMAT: D-S

The followins letter was mailed on 24-NOV-81 at 21:42:57.

In runnins the CALLS.LOGGED file the majority of the time between tx and ACK was 3 seconds or less. The next time lapse was between 3 & 5 seconds which occured aprox. one quarter of the time. The lonsest pauses lasted approx. 10 seconds, and only occured about one eishth of the time of the dump. Since 01Nov81 @ 10:02:35 until 24Nov81 10:09:55 there have been 237 calls lossed on KA6M**. 197 calls have been made via packet radio and 40 calls have been made by telephone. The calls were made by 19 various stations/ persons, and 87% of the calls lossed were made by 6 stations/persons.

But the DG probably has this all fisured out anyway, but I thousht that you misht be interested.

How are thinss soins on the proposed steerins srouf?

73, -ceas-

To: HM
From: -cas-

I found this information in the "Packet Radio" handbook and thought that you might be interested.

Inexpensive radios used for VHF/UHF amateur service usually have turn around times on the order of 100 ms. At transmission rates of 2400 bps these delays can be longer than the actual packet. These delays must must be dealt with in the protocol. For instance, if the protocol dictated that a packet be sent immediately after the last character was entered, without providing a turn-on delay, the first part of the packet would never make it "on the air" due to the transmitter being off frequency or at less than full power output. In a polling system these delays become even more burdensome in that everytime a poll is issued the turn-on delay must be observed. This is only one of the reasons why modern protocols tend to be random access.

This information was provided by VE2PY, Robert Rouleau and VE2BEN , Ian Hodgson.

One might consider the possibilities of a packet radio clinic, one day, as I mentioned before. For personal reasons, this would benefit me, as I feel that I know a little more about computers than I do radios. If the repeater radio, and all concerned stations were to sync frequency then a honest evaluation of the protocol delays could be attempted, and perhaps diminished to some desree. Just a thought.

73, Curtis

3395 BALBOA #8
SAN FRANCISCO, CA 94121
24 Nov 81

Dear Hank,

I'm fascinated with Packet Radio and very interested in getting up on KA6M/R. Enclosed is postage and a label for the technical info.

I program my TRS-80 Model I with 48K and two 5¼" drives. I have published programs in BASIC and Z-80 assembler, and am interested in writing programs for packet.

My operation is a study in budget computing, and I hope to simulate as much of the hardware as possible with software. My TRS-80 has a speed mod that runs the clock to 3.55 MHz, which should help a little.

I believe the only thing I won't be able to handle is the modem, so if you know [redacted] where I can get the required device, kit, or even just a board, I would appreciate the info.

73 and thanks,
"MOJO"
Mouse Jones, AA4KB

Replied 11-29-81

TO: HM
FROM: PLR
SENT: 22 NOV 81 15:04:31
READ: 22 NOV 81 21:53:59

FROM: DAVE BORDEN, K8MMO
TO: HANK, KA6M
SUBJ: PROTOCOL

1. OK I GIVE IN YOU ARE OK ON YOUR FIRST LOOK AT CHANNEL. I STILL THINK I WILL KEEP THE CODE FOR MYSELF TO BE THE FASTEST GUN IN THE EAST.

2. WE ARE TRYING OUT THE CAL TEAGUE CODE AND I REALLY LIKE THE LINE FEED ON CARRIAGE RETURN. I TYPE FAST ANYWAY (USALLY WITH ERRORS) AND I CAN REALLY INCREASE MY THRUPUT. I OF COURSE HAD TO ADD THE PULLUP ON MY 8250 PORT AND I RECEIVED NOTHING TILL I DID. JON, KE3Z HERE DOES NOT LIKE THE CHARACTER SEQUENCE IDEA, SO I CHALLANGED HIM TO COME UP WITH SOMETHING BETTER AND HE IS TRYING.

3. I HAVE CHANGED OUR LIPS TO SET BIT 6 VICE 5 FOR REQUEST TO REPEAT. I THINK THE ONLY CHANGE WAS A OC VICE A OA IN THE LIP ROUTINE CONMOVE.

```
        IF      RPTR
        ANI      80H
        JZ      CONDIR
        MOV     A,M
        ORI     0C0H            ; FORCE REPEATER OUTPUT RANGE
```

4. AM LOOKING FORWARD TO THE 1933 CODE. WE ARE GOING TO GO WITH THE TNC REPEATER FIRST BUT I AM GOING TO GET THIS STD THING READY. IF YOU WANT TO DO ME SOME PROMS, K8MMO/R IS FINE.

5. JON AND I ARE PLAYING WITH THE TWO TNC/MODEM/RIG IN THE SHACK TRICK LIKE YOU MUST HAVE WHEN YOU STARTED YOUR REPEATER. MY BENCH IS A MESS, HAVING LOTS OF FUN THOUGH.

6. I AM GETTING LOTS OF ORDERS FOR SNAKE OIL. HOW MANY CHIP SET MONIES DO I OWE YOU. I GOT CONFUSED CAUSE I HAVE SOLD SOME OF MINE AND ALL OF YOURS. I THINK IT WAS 5 SETS. TELL ME THE NUMBER, I WILL SEND YOU THE CASH AND THEN REQUEST SOME MORE. I SOLD ALL 15 BOARDS WE GOT AT THE CONFERENCE. TURNAROUND TIME FROM VANCOUVER IS SLOW NOW GUYS TELL ME. MAYBE SINCE DOUG LEFT YOU SHOULD GET THE PRINTS AND MAKE SOME BOARDS. WE WOULD, BUT THE LAST CUT OF MODEM BOARDS I SAW FROM OUR PC GUY WERE AWFULL. I DONT THINK HE KNOWS WHAT HE IS DOING.
73....DAVE AT IAD

TO: HM
FROM: PLR
SENT: 22 NOV 81 15:04:31
READ: 22 NOV 81 21:53:59

FROM: DAVE BORDEN, K8MMO
TO: HANK, KA6M
SUBJ: PROTOCOL

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3. I HAVE CHANGED OUR LIPS TO SET BIT 6 VICE 5 FOR REQUEST TO REPEAT, I THINK THE ONLY CHANGE WAS A 0C VICE A 0A IN THE LIP ROUTINE CONMOVE.

```
        IF      RPTR
        ANI      80H
        JZ      CONDIR
        MOV     A,M
        ORI     0C0H            ; FORCE REPEATER OUTPUT RANGE
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73....DAVE AT IAD

Date: 21 NOV 81
From: Hank, KA6M
To: Dave Borden, K8MMO

I think if you inspect the code carefully you will find that if someone tests the channel for carrier and finds it busy, he will immediately go into a random delay. Anyone who was in a random delay and times out first checks for carrier, and if busy, goes into another random delay. One can only transmit immediately if there is no carrier on the first attempt at testing the channel. I don't think the situation you outlined is possible the way I arranged the code. Yes, please put it in QEX.

Very glad to hear that you ordered the MOSTEK card. I'm finding support for the STD bus usage from quite a few different sources. I hope you ordered the CPU-2 card and not any other model. We'll be compatible if you did. I will send you the 1933 code, of course, but you're going to have to convert the assembly language calling sequences from Pascal/Z to Pascal/MT which will take some work. In order to get you on the air quickly, maybe I can burn for you a set of 2716 eproms with your call and beacon messages. That would give you something to try right away. What call would you want on them and when will your hardware be ready?

Dave Engle found a batch of VADIC 202 modems, and we bought the whole lot (9). I think we will have a good market for them here, and it will let our group grow.

I finally got one of my Cermetek modems to work properly. A long string of bad chips and some fundamental design problems had to be worked around. I'll give you a more complete report as soon as all the units are functioning. Ken Archibald, the Director of Sales, is W6TMA, so now we know who to contact. I'm going to talk with him and see if they want to support this product over the next few years and if they think the ham market would be good for their business. They might want to phase out usage of the 202 chips, and if so, we shouldn't pursue it anymore. We'll see.

73, Hank

TO: HM
FROM: PLR
SENT: 21 NOV 81 13:08:23
READ: 21 NOV 81 18:20:37

FROM: DAVE, K8MMO

TO: HANK, KA6M
SUBJ: AGGRESSIVE STRATEGY
1. LOOKS LIKE AT FIRST GLANCE THAT YOU HAVE PROGRAMMED THE CLASSIC CASE. TWO USERS ARE TALKING TO TWO OTHER USERS ON THE CHANNEL. USER ONE KEEPS LOOKING AT THE CHANNEL FOR USER TWO TO FINISH HIS PACKET. THE PACKET FINISHES AND USER ONE FINDS NO MODEM ON CHANNEL. USER THREE HAS ALSO BEEN LOOKING AT THE CHANNEL FOR NO MODEM. BOTH FIND IT FREE AND TRANSMIT, SMASHING EACH OTHER. IF EACH LOOKED UP A RANDOM DELAY, THIS WOULDN'T HAPPEN.
2. I AM PROBABLY WRONG. I WILL ZAP SOME PROMS AND TRY IT. IF IT WORKS WELL, I WILL KEEP THE CODE TO MYSELF AND BE THE FASTEST PACKET ON THE CHANNEL...HI.
3. THANKS FOR THE MESSAGE AND CODE. I WILL PUT IT IN QEX I GUESS. IF YOU WANT ME TO WAIT TILL YOU TEST IT BETTER, LET ME KNOW. OR YOU CAN SEND IT TO PAUL YOURSELF.
4. AM ORDERING MOSTEK STD Z80 BOARD. IF YOU STILL WANT TO SUPPLY THE ASSEMBLY CODE TO DEAL WITH THE 1933, I PROMISE NOT TO GIVE IT AWAY OR SELL IT. IT WOULD HELP ME GET THE THING AIRBOURNE SOONER. IF THERE IS SOME CHARGE, LET ME KNOW.
5. 73...DAVE

TO: HM
FROM: LSK
SENT: 20 NOV 81 10:52:12
READ: 20 NOV 81 13:32:07

HANK KA6M
DOUG VE7APU

THIS IS THE FIRST MESSAGE FROM MY NEW INTELLIGENT WORK STATION AT THE OFFICE. THIS IS A HOME MADE VERSION OF AN APPLE WHICH WE CALL AN ORANGE AND HAS A FLOPPY ON IT ETC. THINGS HAVE NOWHERE TO GO BUT UP FROM HERE ON IN. I WILL BE ABLE TO CALL IN REGULARLY AND WITH MUCH GREATER EASE NOW.

I WILL BE AWAY NEXT WEEK IN VANCOUVER FOR THE WHOLE WEEK AND THEN IT WILL BE BACK TO WORK WITH YOU ON THE LINKING REPEATER THINGS WE ALL WANT TO DO.

REGARDS - LARRY VE3QB

**

2343W

ALFRED B. CHAN
898 CABOT LANE
FOSTER CITY, CA 94404

(415) 876-4145 BUS.
(415) 574-3048 RES.

NOV. 20, 1981

DR. H. S. MAGNUSKI, KA6M
2452 EMBARCADERO WAY,
PALO ALTO, CA 94303

DEAR HANK:

I'M INTERESTED IN PACKET. PLEASE LET ME KNOW THE FOLLOWING:

(1) HOW MUCH IS MEMBERSHIP DUES?

(2) IF MY AK-1 (RTTY AFSK) WON'T DO THE JOB, HOW MUCH IS THE PC BOARD FOR THE 1200 BAUD MODEM AND WHERE CAN I BUY ONE?

(3) WHERE CAN I GET DETAILED VADCG PROTOCOL?

(4) IS THE PACKET REPEATER WITHIN REACH OF MY QTH? WHERE IS IT LOCATED?

ENCLOSING SASE. THANK YOU.

SINCERELY,

Al Chan

ALFRED B. CHAN, W6DNT
898 CABOT LANE, FOSTER CITY, CA 94404
HOME: 415-574-3048 OFFICE: 415-876-4145 (UAL)

**

Reply ltr 11-23

Robert J. Diersing, N5AHD
4129 Montego
Corpus Christi, Texas 78411
November 19, 1981

Dr. Hank Magnuski, KA6M
311 Stanford Avenue
Menlo Park, California 94025

Dear Hank:

I recently attended both the AMRAD and AMSAT conventions and enjoyed your presentations very much.

I have an extensive background in computer programming and operations on both large main frame systems and microcomputers. I am currently Director of Computer Services at Corpus Christi State University.

WA2LQQ directed me to you for a copy of the AMICON SSC specifications that you have developed. I intended to try to get one at the meeting and neglected to do so. Could you please provide me with that information at your convienence. I would also appreciate being placed on your mailing list for any future information regarding AMICON. If there is any charge for postage and handling please let me know.

73,

Robert J. Diersing

Mailed 12-3-81

HANK -
THE 1200 BAUD PRENTICE BOARD U ASKED ABOUT ; I HAVENT DONE ANYTHING WITH IT, SINCE MY DIGITAL BACKROUND JUST ISNT ADEQUATE FOR THE JOB.
I WOULD MAKE IT AVAILABLE (CHEAP) TO ANYONE WILLING TO GIVE IT A SHOT. THE OTHER BOARD I BOUGHT AT THE SAME PLACE (300 BAUD) WORKED FINE, BUT WAS AUTO-ANSWER-ONLY.

I ONLY GET ON THE SYSTEM ONCE IN A WHILE, SINCE I AM STILL WAITING ON THE Z19A TERMINAL (RFI SHEILDED).

IT SOUNDS LIKE PACKET-NETWORKING IS TAKING OFF. I LOOK FORWARD TO GETTING ON, ON A MORE REGULAR BASIS.

LATER,
ROB - KA6NAN

Hi Hank: Got these messages on one of the systems that I work and thought that you might be able to help?

Curtis:

Do you have any info on the ISO Standards X.21, x.25, etc.? It looks as if X.25 is going to become a de-facto international standard, and I'd like to have a stab at getting it up on my Apple, rather than having to buy the software.

What I'b like to get is the specifications, so that I can work up a Pascal (or maybe Basic....or Forth) program to implement it.

Would this make a sub-branch of your Ham Radio Branch, or should it branch off on its own??

Sam'l Bassett

X.25

Whichever way Curtis responds, others might be interested in this also:

CCITT X.25-1978 -- PROVISIONAL RECOMMENDATIONS X.3, X.25, X.28 AND X.29 ON PACKET-SWITCHED DATA TRANSMISSION SERVICES (NTIS #PB 283257) IS AVAILABLE FOR $8.00 FROM:

NATIONAL TECHNICAL INFORMATION SERVICE
DEPARTMENT OF COMMERCE
5285 PORT ROYAL ROAD
SPRINGFIELD, VA 22161

THIS INFO IS "FRESH" AS OF JULY 16, 1981. SOURCE:
COMMUNITREE -- FIRST EDITION MANUAL.
REGARDS,
D-G

And I thought that" non-amateurs" would have little interest in packet.

If you have any info that would be useful, could you direct me?

Regards
73
-Cas-

TO: HM
FROM: PLR
SENT: 18 NOV 81 16:45:02
READ: 18 NOV 81 17:12:56

Date: 18 November 1981
From: Dave Borden, K8MMO
To: Hank Magnuski, KA6M
SubJ: STD Bus Computer

1. Terry Fox, WB4JFI and Jon Bloom, KA3Z are both working on S-100 machines for the station node. Jon is a so setter and super tech and will probably get one done fairly soon.

2. Since these packeteers are working on S-100, I think I will try the STD Bus idea. I have the case I got from you and am wrapping the four connecters together. I have the schematic of your 1933 board to go by.

3. I have been reading your stuff to Larry and as soon as the 8273 design is done, I would appreciate a copy of the schematic. I like the small size, but Terry says we should use S-100 since we both have a shack full of it.

Date: 18-11-81
From: Al Hanscom Restrictions

The LIPM eproms in KA6M** have been changed to alter the carrier-sense random timeout strategy being used:

1. The random number being generated is smaller, resulting in a shorter overall wait.

2. If the channel has no modem carrier on it, the transmission occurs immediately, and no random delay is introduced.

We will be experimenting to see if these changes improve the overall responsiveness of the system. Let me know if you notice any improvements or problems.

AMRAD

Amateur Radio Research and Development Corporation

1524 Springvale Avenue
McLean, Virginia 22101
1981 November 10

Stephen E. Robinson, W2FPY
47 Serpentine Road
Ringwood, NJ 07456

Dear Steve,

This is in response to your telephone request for guidance on assignment of frequencies for 220-MHz packet repeaters in your area, in particular simplex vs duplex.

As you are well aware, this subject has been a matter of controversy for some time. Your call underscored the need to come to a workable agreement among the AMRAD directors and others active in packet radio so that internet planning can get going. Some of us got together last night to thrash it out.

The basic reason for using duplex would be increased throughput. Simplex operation, on the other hand, is less complex (no need for a duplexer) and facilitates easier frequency planning.

In the discussion, it became clear that the increased throughput possible with duplex operation cannot be achieved while we are still using the TNC board at the repeater sites. The only actual throughput realizable immediately is elimination of the T/R turnaround time associated with simplex repeaters. Of course, duplex repeaters have the potential of duplex operation when the receiver and transmitter have independent protocol controllers or if one protocol controller is used in full-duplex mode using interrupts. The fact is, however, that are only protocol controller at the moment is the TNC board. VADCG and AMRAD have done some work on a station node controller which would be needed to permit full duplex operation. VADCG has one wire-wrapped S-100 board and is in the process of redesigning it for pc layout. The wire-wrapped board has 4 HDLC ports, while the pc board can physically accommodate only 2 HDLC ports. Within AMRAD, Jon Bloom, KE3Z is working on an independent design. For now, we must live within the capabilities of the TNC board.

Here is a summary of the conclusions that we reached:

- Packet repeaters in the East Coast chain should operate simplex as standard.

- The frequencies of operation should be chosen from the list of 220-MHz frequencies given on page 3 of the proceedings of the ARRL Amateur Radio Computer Networking Conference, vol. 1. More specifically, we nominate the center simplex frequency of 221.2 MHz.

- Initial operation will be at 1200 baud using Bell 202 modems and VADCG TNC board. Radio receivers and transmitters will be of the fm voice variety operating afsk with a deviation of ±5 kHz.

- AMRAD (more specifically, Dave Borden, K8MMO) will undertake design of the repeater firmware to support these interim internet repeaters. He will do this in consultation with KA6M and VE7APU.

Everyone involved should understand that the above standards are *interim* and are to be replaced by new high-speed/wide-band standards when developed. They apply only to the internet chain and have nothing to do with local area network (LAN) standards. Local groups are encouraged to develop their own LANs separate from the internet or backbone network. For example, a LAN could use 2, 1-3/4 or 0.7 meters, simplex or duplex, according to their local needs. Also, the recommendation of simplex operation for the internet as standard does not preclude translation to another simplex channel or to duplex channels where appropriate.

Thinking on the wide-band standards is progressing. The most critical decision to be made at the moment is the type of modulation to use. Candidates are: fsk, dpsk and qpsk, all synchronous, of course. We would like to talk to someone with design expertise in psk modems.

I hope that the above will help you to get started. Please let me know if you need anything else. Also, we would like to be kept up to date with your planning and progress. The best way to do that would be a monthly update to include with Dave's Protocol column in the AMRAD Newsletter.

Everyone here is very much impressed with your progress lining up packet repeaters for the backbone network. Don't stop now.

73,

Dave

Paul L. Rinaldo, W4RI

cc: K8MMO
WB4JFI
WB5MMB
KA6M
VE7APU
K1ZZ

1524 Springvale Avenue
McLean, Virginia 22101
1981 November 10

Stephan E. Robinson, W2FPY
47 Serpentine Road
Ringwood, NJ 07456

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Everyone here is very much impressed with your progress lining up packet repeaters for the backbone network. Don't stop now.

73,

Paul L. Rinaldo, W4RI

cc: K8MMO
WB4JFI
WB5MMB
KA6M
VE7APU
K1ZZ

SENT: 13 NOV. 1981
TO: HANK
FROM: BRIAN

HANK --

Sorry about not getting back to you sooner. I would like to pick up the board from you, but I have not been able to get in touch with Dave. I was thinking that I should just pick up the board from you directly. Would it be ok if I stopped by next week on Monday or Friday (I have classes the other days)? If so, I will need to get your work address. Perhaps we can have lunch together?

Your series of seminars were a great success. Although my time is sometimes rather limited, I would be glad to contribute whatever I can in terms of time or resources that I have available.

Hope to hear from you soon.

73... Brian

Hank,

Thank you for your thoughtful message. I appreciate it very much.

Bob

Hank:
I have access to some Data General manuals. What operating system is beins used for this application? Hopefully I can set the manuals.

How do you send mail to the sroup? Packet sroup that is.
How do I define a set of users to send mail to? that is with out sendins to each individually.

73
Dave

The followins letter was mailed on 12-NOV-81 at 20:45:07.

Hi: I have been playins around with the stuff here and sot one of the old BBS systems to work. Am now curious as to the possibilities and aprox. cost of havins somethins like KA6M** (smaller scale..N6ECT*) runnins out of here on my micro. No bis deal...I'd just like to try it.

Hi Hank: Would it be ok if I put Larry's and your letters on the Conference Tree in San Francisco? Thought that I would ask, just to make sure. Had ABC here today lookins into the possibilities of doins a series on Survival in the 80's. Needless to say, communications is one of the larger areas in the realm of survival, I will wait to see where it goes, before I set too involved. I had a really nice conversation with KD6LI, Brian, yesterday and found out that he was also interested in satellite communications. I also sent Cal a note about the same subject..... Anyway have a good day.

73, -cas-

Hank:
Well I logged on to try it out. Havent gotten stuck yet so I'll keep on trying. This is a good way to keep up to date I will try to use this mechanism to keep in touch for awhile rather than calling on the phone. See how it goes. Can we get mail to Doug Lockhart through this mechanism?
73
Dave Ensle

Date: 10 November 81
To: Larry, VE3QB
From: Hank, KA6M
Subject: Linking Repeater Strategy, continued

Well, I am very encouraged by your recent note, because I agree with you nearly 100% on each point mentioned. In particular:

In the long term, when we are ready to deploy many repeater sites, a single board micro would be the cheapest and most reliable solution. The points you mention on connectors and cost are well taken. However, we first must understand:

> How the protocol might affect hardware design, and the demands the software will place on the hardware.
>
> What the final configuration of RF and modems will look like.
>
> What other system constraints might be placed on the linking repeaters which might affect their design, such as a requirement for some form of local access and other gateway functions.

The STD will serve very well as a prototype environment for these questions, and not lock us into an arbitrary design. The hardware for linking repeaters and terminal stations or local networks need not be the same, but please keep in mind the buying power of volume purchasing. In terms of numbers, home terminal equipment will dictate what gets bought in large quantity, and any other facilities that can use parts common to user nodes will benefit from the reduced costs. Once the linking repeater requirements are well understood, we can commission someone to design and manufacture them. A commercial enterprise might be willing to jump in at that point, when the market looks well defined and stable.

At the Gaithersburg session we rather extensively discussed and came to the same conclusion as you did on these issues:

> Local networks will be very different, based on local needs and talents. No particular attempts should be made to straightJacket local network designs, as long as they can properly interface to the backbone networks. In practice, commonality will spread the burden of hardware and software support and development over many users. We have already discovered, however, that when you have "local area net" repeaters spread over a limitd geographic area, the distinction between "backbone net" and "local net" gets very murky very quickly.
>
> There will be several different forms of link level protocol, in particular for the different VHF/UHF rates, for HF, and for AMICON. Some of the links may even be telephone oriented, as in PCNET.
>
> What is really needed in terms of a common spec is the interface between different link-level protocols and some of the higher level protocols. Thus, we are primarily talking about levels 3 & 4 in the ISO scheme. My promotion of DoD INTERNET is an attempt to fill this design gap. (NBS has adopted a protocol very similar to the DoD IP spec too!)
>
> Unresolved is what kind of a group or board or steering committee will approve the final details and say "THIS IS IT".

So we agree on some of the major points, and so do the folks at AMRAD.

Your comments on "202" incompatibility are interesting. We have not encountered

that problem yet.

Bill Putney has volunteered to start an 8273 STD design, and may include an 8250 on the same card. He also has a CPU emulator card driven from an S100 system.

What's next?

73, Hank

TO: HM
FROM: LSK
SENT: 10 NOV 81 13:27:35
READ: 10 NOV 81 15:27:22

KA6M, Hank and Group
Just quickly reviewed your latest and we have a lot agreed upon. As to what is next I need to get a VHF linking system working. Standards are funny, they tend to be what works and is available without a mind bending exercise. If we get something working that is relatively easy to get going and reproducable then we have a chance that IT will be the standard. Our use of direct FSK on our system has so scared locals from a comprehension point of view they just cant overcome the hurdle and get things going. If it isn't an applique, like a touchtone pad on FM, that applys directly to a microphone circuit they are unable to get over the hurdle. At this point then we need a system outline and ----more later

Hi! I was lookins at the new A5 mas, and saw somethins that misht be interestin
N7AOU Bill Munsil founder of the AAA5 ATV Grour in Arizona reports all is
soins well with the new 2300 MHz. transmitter for their repeater project.
The 1253 MHz. TV receiver has been completed and tested for a full 24 hour
period includins audio and AGC. When the system is completed, it will be
an ATV Repeater wit&
r without subcarrier audio &
and 2380 MHz receivins and demodulatins in addition 2 Meter ASCII and Baudot
RTTY.
73, -cas-

TO: HM
FROM: LSK
SENT: 09 NOV 81 06:48:00
READ: 09 NOV 81 14:24:46

KA6M, HANK AND GROUP

REGARDING YOUR COMMENTS ON THE USE OF A SINGLE BOARD MICRO FOR REPEATER SERVICE.

FROM A PHILOSOPHICAL POINT OF VIEW SINGLE BOARD MICRO VERSUS STD BASED WE HAVE NO STRUGGLE WITH - WE JUST DON'T LIKE EDGE CONNECTORS - AT ABOUT $8. (CANADIAN) APIECE AND THE ATTENDENT CONTACT PROBLEMS. IN REALITY IF THE DESIGN WE GO FOR IS STD, WE WOULD USE AN STD FOR PROTOTYPE DEVELOPMENT AND A SINGLE BOARD IN IN REMOTE SITES.
AGAIN WE FEEL THAT ONCE A TOTAL SYSTEM COMPONENT (IE LOCAL NETWORK LIKE OURS, YOURS, MONTREAL) WORKS IT IS USED UNTIL THAT
SPECIFIC COMPONENT LIMITS APPLICATIONS TO AN UNACCEPTABLE LEVEL.
AT THIS POINT IT IS REPLACED. AS WE SEE IT, VHF LINKING SHOULD (MUST?) BE INDEPENDENT OF LOCAL NETWORKS AS MUCH AS IT WILL BE INDEPENDENT OF AN HF PROTOCOL (IF THE HF IS TO WORK AT ALL WELL).
AMATEURS, AS WE ARE EXHIBITING IN THIS DISCUSSION WILL CHOOSE PARAMETERS FOR LOCAL REASONS - OUR CONCEPT OF THIS DISCUSSION IS TO SEEK A CONSENSUS OF AN APPROACH TO LINKING - THE RESULTING LINKS WILL HOWEVER I'M SURE REFLECT INDIVIDUAL NEEDS ETC. CAN WE AGREE TO SEPARATE LINKING AND LOCAL REPEATER SERVICES FOR THIS DISCUSSION?

WE HAVE LEARNED FROM VERY HARD EXPERIENCE IN REPEATER WORK
- NEVER TRY TO RECONFUGURE OR REPAIR AT A REMOTE SITE -
- REPLACE THE UNIT COMPLETELY - RX,TX, MODEM, POWER SUPPLY OR MICRO AS UNITS.
FAILURE TO DO THIS, IN OUR ENVIRONMENT, RESULTS IN CATASTROPHIC PROBLEMS EVERY TIME. OUR LOCAL REPEATER IS CARD BASED, DESIGNED LONG BEFORE STD, AND WE HAVE NEVER SUBSTITUTED A CARD WITHOUT PROBLEMS. WE NOW REPLACE THE WHOLE BOX
- IN THIS CASE POWER SUPPLY AND MICRO - AND REPLACE IT AS A UNIT AFTER A CHECK OUT ON THE BENCH.

IN SUMMARY THEN CAN WE AGREE THAT DEVELOPMENT IS STD AND IMPLEMENTATION IS EITHER - DEPENDING ON LOCAL NEEDS?
CAN WE AGREE THAT VHF LINKING, HF LINKING, AMICON FOR SATELLITES ARE PROBABLY DIFFERENT - MAYBE RADICALLY DIFFERENT - MAYBE BROTHERS ETC?
I PERSONALLY DON'T BELIEVE WE AS AMATEURS WILL EVER AGREE ON A SINGLE, ALL PURPOSE, PROTOCOL FOR EVERYTHING.
TOO MANY OF US WANT TO EXPERIMENT AND TRY "OUR THING " ETC.
CAN WE RECOGNIZE THIS AS FUNDAMENTAL TO OUR CAUSE?

WITHIN THE FOREGOING I DON'T SEE A NEED TO HAVE ALL VHF LINKING EXACTLY THE SAME. MODEMS AND SPEEDS COULD VARY FOR INSTANCE, WE MAY WELL USE 300 BPS AT FIRST ON OUR LINKING WORK JUST TO USE READILY AVAILABLE MODEMS.

INCIDENTLY WE HAVE BEEN LOOKING AT 202'S AND FIND THAT THERE ARE 3 REPEAT 3 INCOMPATIBLE 202 "STANDARDS", SUCH AS CCITT AND WESTERN ELECTRIC.
A NEW APPLE COMPATIBLE (LIKE DC HAYES MICROMODEM)
HAS RECENTLY BEEN DISCOVERED TO BE CCITT BASED AND WILL NOT WORK WITH A WECO BASED PRODUCT.

IN SUMMARY THEN DO WE HAVE AGREEMENT ON THE FOREGOING?

I AM TYPING THIS BLIND HOPE YOU CAN READ IT.

REGARDS

LARRY, VE3QB

TO: HM
FROM: JOHN, VE7ADE
SENT: 05 NOV 81 21:13:06
READ: 05 NOV 81 23:31:25

Hank,
You should have the last batch of boards by now. They were not mailed by Bob Finch until last Thursday for some reason.

We have about 60 boards left for now, so we could easily send some if you like

Don has sent off the check for the ICs.

He would like to know if he should mention them in the 'PACKET' for you. Also the price correct and should he give the company name out?
thanks, John

311 Stanford Avenue
Menlo Park, CA 94025
November 4th, 1981

Mr. Paul L. Rinaldo
1524 Springvale Avenue
McLean, Virginia 22101

Dear Paul,

There was absolutely no problem in duplicating the paper, so don't worry about it. In fact, I was thinking about doing it over using a carbon ribbon for better quality, and you gave me the opportunity.

Enclosed, too, are the remaining checks for the proceedings.

At our meeting last night we discussed extensively the organizational issues and it turned out that the group was nearly unanimous in desiring a technically oriented society, and quite a few knew about AMRAD and liked the general idea of an affiliation. However, since we have no formal organization at the moment, many thought that some initial groundwork had to be done here first. Our meetings have been just a collection of interested individuals, and we don't even have anything resembling a steering committee. In the mean time, some had questions of how an affiliation would work, and I would appreciate any thoughts you have on how AMRAD would like to handle out-of-town relatives. Would this be the start of a national technical society, as QEX is to QST? There are really no clubs that deal just with technical experimentation, and several suggested widening the scope to include other things besides packet radio. I wouldn't mind that, except I've been keeping a very narrow focus and am concerned about diluting the effort given the finite time and energy I have. So please write me about what you think would be the optimal solution from your perspective.

Thanks for the kind words to Doug DeMaw. I received a very nice letter from him.

Best regards,

Hank Magnuski

712 Hillside Dr.
Carlisle, Pa 17013

November 4, 1981

Dear hank,

I had hoped to attend the Packet symposium in Washington, but had a meeting I had to attend in New Orleans that same weekend. I am reasonably familiar with RTTY, the TRS80, and standard modem-type communications. I know very little about packets and am trying to learn and to see what interest I might be able to stir in our area. Paul rinaldi has suggested trying to get a 220 packet machine just south of year which might be able to link with the 220 one in Washington. I am writing to you to get some general information--and remember I really am green when it come to this subject. I will appreciate any help you might be able to provide about your system and users of your system.

There are a lot of specifics I need to know, and i imagine there are several areas where I am just too ignorant to ask the right questions. For example, what functions are required of users of the system you have? That is can then just send to the system in RTTY/ASCII or do they all send in a packet format? What is the packet format--what are all of the bits required? What is the protocol by which the system operates for errors and message holding/forwarding? what functions does your system carry out? What does it do as far as error recognition, fill request, and fill provision? What did you have to do to prevent system lock-ups which everyone seems to fear? In practice how does your system work? How much use does it get, and does it connect with any other systems? As you can see I will appreciate just about verything.

Thanks very much for your help. I have enclosed a SASE for your convenience and I do appreciate your time in answering.

Sincerely,

Buzz

Buzz Gorsky, K8BG

Replied 11-29

Date: 02 NOV 81
To: Larry, VE3QB
From: Hank Magnuski

I have been contemplating some of your linking repeater hardware requirements, and have been discussing this issue along with the issue of how to extend and/or replace the Vancouver board to provide for upward growth of the network hardware and software.

You mentioned a single board micro. I see these advantages in that concept:

1. Low cost, easy to reproduce, and few interconnections.

2. No motherboard or bus required, no card connectors.

3. Would support anticipated requirements for a linking repeater.

Now for the disadvantages:

1. Becomes a unique, fixed design, with little flexibility for trying new hardware configurations.

2. Cannot change CPU's or add memory easily or add extra I/O ports or configure the hardware in some other way.

3. Single boards tend to grow linearly in dimensions, and do not lead to compact packages. All new chassis and mounting hardware must be designed for them and packaging is not particularly easy.

4. Debugging may be difficult because of a lack of extra memory for a debugger, no async serial I/O port, etc.

We are seriously giving thought to extending the STD CPU design to create an 8273 HDLC board and an 8250 board. I would like you to contemplate going in this direction and take a look at some STD cards if you can find some:

1. The cards are small, easy to breadboard and contain only the functions required.

2. The system can expand in many different directions for many different purposes, using a common core of hardware and software.

3. There is already available a wide selection of cards at attractive price levels.

4. Amateurs have used 4 1/2" x 6 1/2" cards for many years now, and these 56 pin cards are very similar to the popular 22/44 ones. Many different card racks and boxes are available new and/or surplus for this size.

5. We have real experience using this technique in our repeater, and it works.

6. S-100 cards, the only alternative, are too big.

7. I think the card/system bus could be accepted by the amateur community.

Our second repeater will be based again on this bus design. Dave Borden, K8MMO, of AMRAD was very enthusiastic about the size and possibilities of this system. A fellow in BOSTON is building a similar STD based repeater. Several hams here are also quite enthusiastic about this approach, as we have developed

a plan for utilizing the bus as an I/O device, run by an emulator CPU card driven from an S-100 system.

I'll be interested in hearing your comments on this approach.

73, Hank

```
SCR # 116
  0 Hank,
  1
  2 I will be able to get any of the FORTH products advertised in
  3 the latest issue of Byte (Oct.) on Wednesday night.  Check the
  4 ad on page 229 by Mountain View Press.
  5
  6 I telephoned late today but you were gone.  We can try again
  7 tomorrow.
  8
  9 At last the conference tree group telephoned so maybe something
 10 will happen on that front.  I will meet with them next Thursday.
 11 I will add a copy of my message to Curtis at the end of this one
 12 one.
 13
 14 I enjoyed lunch today.
 15                                        ...Bob W6JHJ
```

Copy of message to Curtis:

```
SCR # 117
  0 Curtis,
  1
  2 Dean Gensle telephoned today to work out an appointment to
  3 discuss a packet radio conference tree.  We set next Thursday
  4 the 5th of November to meet at his house in San Francisco.  He
  5 will probably invite you because I suggested that it would be
  6 very helpful since you are following the tree in SF and have a
  7 packet system going.
  8
  9 I want to get a conference tree going on packet radio but do not
 10 have an Apple so the software will require modification.  With
 11 a FORTH system running here it should not be very difficult to
 12 make the necessary modifications.
 13
 14 Your support would be a big help in getting this project going.
 15 I hope you can make the meeting.............Bob W6JHJ
```

Hello Hank,

I think I have finally found my long standing problem with the conversion of the packet program to the 8080 based Heath H-8 computer. After countless hours of work on the TIP portion of the program, and the expense of purchasing a 8250 based I/O board, I discovered the problem to be in the LIP portion of the code. It seems in my original conversion of the program to 8080 I made only the most necessary changes in the code to allow it to execute in the 8080 environment. As you know the 8085 has a more sophisticated interrupt system than the 8080, and the orginal (VADCG) software used two different interrupt levels for the 8273 HDLC chip. In my conversion I had, out of necessity, to combine the transmit and receive interrupts to one level in the 8080. To make a long story short, at times my code was trying to handle both the transmit and receive interrupt process at the same time. It only took a very modest change to insure only one process is allowed to run at a time.

In testing the program's ability to transfer files between packet nodes I found that quite often I seem to overrun the DG's ability to copy files when using the COPY <fname> @INPUT command. It seems at times when the overrun occurs the DG aborts back to the command mode, and then tries to interpret the incoming text as commands. That further compounds the problem as my code has no way to detect anything has gone wrong except if flow control is enacted. It would seem the DG should flow control the packet port to prevent the overflow in the first place. Does the DG provide flow control toward packet? Or perhaps there is another command better suited for this application?

Ed Mersich WA6R7W
2035 pst 27 Oct 81

>

```
SCR # 118
  0 Hank, 8080/Z80/CPM FORTH stuff is available from:
  1
  2       Laboratory Microsystems
  3       4147 Beethoven St.
  4       Los Angeles, CA 90066
  5       (213) 390-9292
  6
  7       Timin Engineering Co.
  8       9575 Genesse Ave. #F-2
  9       San Diego, CA 92121
 10       (714) 455-9008
 11
 12 You may want to telephone them for details about their product
 13 and if it conforms to FORTH-79.  It may not, but if it is fig
 14 FORTH it can be fixed without a big problem.
 15                                   Bob WAJHJ
```

Hank,

Your trip back East sounds most interesting. Perhaps we can get together for lunch sometime this week to discuss it? I'd like to pick up a copy of the proceedings if one is available.

On other fronts, Brian Yee burned a version of TIPMO3 for Woody which comes up in "NO ECHO" since Woody's HAL terminal only has half-duplex. Woody's big problem, however, was that he would only get a few lines from the Vancouver board and then the system would lock up. Sometimes it would occur after just a couple lines, sometime would go maybe 50-100 lines then stop. Fortunately, the new TIP proms fixed that problem as well, so Woody is in good shape. I doubt he will be on much, though, at the moment, since since his main interest is in traffic handling on MARS. I wonder how long it will be before MARS goes packet?

The repeater signal is pretty marginal into Alan Bowker's poor RF location in San Rafael and it remains to be seen whether he will be successful with packet. Woody mentioned that he would be able to switch to a better, higher antenna if necessary. Alan says he is coming along in interfacing to packet. He is coming over tomorrow evening to work out some details. Alan has expressed interest in putting the Horizon/W6RAW mailbox on packet.

Several people have mentioned to me much better results with the new repeater location, and that has been my experience as well, though I have to swing my beam around to direct to you and points south, and the repeater. Is anyone currently on packet worse off with the new site?

- David

Date: 24 OCT 1981 21:20 PDT
To: All packet radio stations
[illegible]
Subject: Notes on October 16th meeting at Gaithersburg

Here are some notes and impressions on the meeting I recently attended. A more complete report will be given at our next seminar.

1. The meeting was attended by 75-80 people. Quite a few in attendance were very well qualified and knew a lot about packet networking. I predict the meeting will have a wide ranging impact and be a big push for packet radio. The conference proceedings will be very widely distributed, I think.

2. A lot of the papers were future plans or proposals or theory. I believe the SF group is probably the largest user community in the world, by a margin of two or three to one.

3. Made new contacts of people in San Diego and Tucson. Will help our western net grow.

4. Swedes are putting together a net at Linkoping Univ. They may be able to provide us with a high-speed modem design, as it is a current research project there.

5. Doug Lockhart was the only other person there promoting a network design. My proposal to use IP was warmly received by several parties. We have to find a tiny-TCP to complement it. The AMICON design may eventually dictate world standards, so it takes on additional significance.
Doug and I disagree somewhat on the Datagram vs. Virtual Circuit approach to networking. Some agreement was reached, however, on terminology and partitioning of network functions.

6. Lots of FORTH enthusiasts. Some version of the network software will undoubtedly be written in that langua[illegible]

7. An AMRAD-CAL will most likely be formed to promote packet net standards for the West Coast.

8. An outline of the East Coast backbone repeater links was put together. People and places were identified for a net starting in Toronto, going to Ottawa & Montreal, down through Albany to NY/NJ, side spur to Boston, down to DC then into Virginia.

9. Dave Borden, K8MMO, really liked the repeater hardware based on the STD card layout & bus. It may be that a Vancouver II design will turn out to be implemented in STD hardware, rather than as a single board micro. There is more flexibility with that approach, and a more compact physical layout.

10. There was a well researched presentation for 600 Hz. shift to be used for HF packet work.

11. Plans are being made for a packet session at Dayton, and a second annual networking conference.

12. I have a limited number of Vol I of the proceedings. A $5 check payable to AMRAD will get you Vol I from me, and the second volume soon from AMRAD. C[illegible]e by and see me, or send me a check and I will bring it to the next

SENT: OCT.24, 1981
TO: HANK, KA6M
FROM: BRIAN, KD6LI

Hello Hank --

How have things been with you? Sorry I didn't make the last meeting, but I had already promised to take some out to dinner for their birthday. I heard it was an interesting meeting. I will surely make it to the next meeting, however. The packet system is quite well known in this area, it seems, as a lot of the hams I have talked to recently al[illegible] it or have heard it in operation.

By the way, if there is anybody who needs to have EPROMS burned, let me know, as I have (I believe) the latest version of the TIP and LIP software available as it becomes available on the DG, and can burn 2708's. I also plan to have a 2716 programmer in the near future, and will be able to burn those also.

Do you have an adequate supply of VADCG boards? If so, I would like to purchase another one to some of the experiments we had talked about (like hooking up some of those RAM chips and some other things I have in mind). Just leave a note for me when you have the time.

Did you go to the conference in D.C. yet? If so, what was the interest level there?

TO: [illegible]
FROM: LSK
SENT: [illegible]
REA[illegible]

KA6M
[illegible]
W4RI
Reference work for your attention
COMPUTER NETWORKS Volume 5, Number 4, July 1981
Articles of interest
Mutual Encapsulation of Internetwork Protocols
The ARPA INTERNET Protocol
Regards
Larry, VE3QB

TO:[illegible]
FROM: [illegible]
SENT: [illegible]
READ: [illegible]

Hank - I would appreciate it verymuch if you could send me the asm for the VADCG software via this facility. It has been suggested that you break it up in several sections as the buffer size is unknown but the limit might be reached. I'm not sure of the format you have it but cpm compatible would be great. Regards Larry VE3QB

TO: [illegible]
FROM: WWP
SENT: 15 Oct 81 09:25:56
READ: 24 OCT 81 20:13:34

Larry , Hank - I Just checked with the [illegible] workspace buffer is "virtually" infinite [illegible] on one 300 Mbyte disk). So if it's easer to send the software in one chunk, feel free.
Bill

Hello, Hank..

The repeater seems to be working fine from its new location. Much better forme, though as I indicated the last time we talked, still cannot contribute to the activity as much as I would like.

I was considering what it might take to "auto-log" onto the computer, but realized that I would have to put some rather sophisticated traps into the software here in order to recognize when various prompts appear. For example, during signon, the user prompt is a colon. Colons also appear in the date line. Following signon, of course the right paren is used as input, in the editor, a line feed is a signal for the next line, at least as it appears here. You probably could care less, which is quite an appropriate response, but as I have developed a small modification to a "MO[illegible]" CP/M file transfer program that allows full auto log and file transfer given a unique prompt from the 'mainframe', I thought it might be interesting to point out the need for real time access h[illegible]

I gather that there has been little response to further packet development, read your note to GNU... am still interested in being involved in a link for Alan, WA&DNR (if he needs such), but simply do not have even a shadow of a chance to play around with the VADCG code to see what might be done. About all I can offer is indication of interest and perhaps later this year will have time to see what could be done. Right now, just getting on once a week to check the mail is just about all the support I can offer. Hi.

I expect to do that at least.... I managed to get over to Brian, KD4LI's QTH last weekend to get the newest software. It really makes using the repeater a treat. So am current along those lines, at least.

The followins letter was mailed on 15-OCT-81 at 09:45:37,

Hi.... Havins problems with my PTT/Rx...will have it worked out soon. I have a name & address for you:

165 North Clybourn
Chicago, IL 60610
(312) 248-2480

They offer the followins:

POWER SUPPLY 39.95$ +5V1A, -5V1/4A, +12V1/4A, -12V1/4A
or
POWER SUPPLY 44.95$ +5V2A, otherwise same as above

I have also located a tripod & fluid head that would meet your needs!!!!

LEITZ tiltall tripod - $100.00
Universal Fluid head - 250.00
$350.00

Original cost about $420.00 the person who made the fluid head started the Miller Fluid Head Co. ---- check out the prices --- I think a good deal,

also!!! If you know anyone interested in a Sony DXC 1640 Color Video Camera (original cost $3,300 & 10 months old)
won't see you before Gaithersburg....so have a nice trip....&....
Please PLEASE bring me a copy of the Conference Papers or Notes.....

Thanking you In Advance

The followins letter was mailed on 15-OCT-81 at 09:47:30,

I forgot to ask.....What did you do with a 555 in regard to the PTT & is there a file on the DG that will tell me about it????????
please put it on my call.....tnx.....-cas-

The followins letter was mailed on 16-OCT-81 at 01:41:

With some luck my Apple (on loan for PCNet work) might be able to edit the source files, but for sure it couldn't assemble them. They might not fit on a disk either, I don't know.

I thought that the network we are designing would be used for this kind like screen editing, or other editing.
If that's the case, we'd better get some idea of the problems and advantages of the kind of setup we've got now. File transfers will for sure be a big part of the AMNET traffic, but interactive use will also play a significant part. (Look at Arpanet...)

I assume my arrangements will be legal, too, once I am as far along as to have the board and transmitter working. There seems to be no support in the amateur community for people who can "be good" (as not interfere with other users of the spectrum) but who haven't had the magic government

October 22, 1981

Dear Hank,

I sort-of met you at the Packet Radio conference last week, I received a clip set from you and a book from Dave Borden, but you were too popular for me to chat with you after the presentation you made.

The parts for the receiver board are on hand or on order and I should be able to assemble that in a few weeks. Dont have a modem yet, but am trying to contact a ceramitek rep about one of their evaluation packages.

Something I want to ask you about. I have a Z-80 (S-100) computer that would potentially serve as the basis for a repeater similar to yours. The idea behind this is that I'm not in the range of the rest of the AMPRNET and until someone closer to me gets going I want have anyone to "talk to". I could work on a repeater by using my computer, an 8273 board driven by a port on my modem. Initially just print the radios and work on communicating with myself via cable. Then I could go from there to demonstrate to others etc.

So - I dont have the write version of your presentation yet and my memory is weak - (1) how wide your repeater is? is it "available"? and is it well documented? what method did you describe using for your 2 second to interface the 8273? Would you care to send me the details of that?

I'm getting into the radio digitally and will probably be way over my head, but if you have the time to send a listing of the software, block diagram or schematic of your protocol chip setup etc I might be able to make something of it and hopefully couldn't do any harm.

This is an initial inquiry if you care to discuss it then we can discuss program media, cost of same + shipping etc (as well as a second 8273 etc)

Second question is about the Casmitek modem - just an idea of any quirks or problems or other advice about it.

Hope to hear from you.

73

Gwyn Reedy W1BOL

M.G. REEDY
3 BAYAU TRAIL
MEDFORD, N.J. 08055

1054 Maryland Ave.
Schenectady, New York, 12308
October 17, 1981

Mr. H. Magnuski, KA6M
311 Stanford Avenue
Menlo Park, CA 94025

Dear Hank,

Thank you for our phone conversation earlier this week. I am sending 4 2708 eproms for you now that I see the size of the programs! Your shipment of the protocol chip, listing and disk arrived safely yesterday. (It is no wonder that the LIP hasn't made it into the Vancouver notes, it's long.)

I appreciate your willingness to help me get started at this end by burning the first set of proms so that I have something definite to start with. This will help the checkout work I will be doing with VE3QB and group. They are trying to do some long distance checkout this winter, and W2ODC and I will be doing some work to help them with the checkout. Toward that end, lets change the requirements on the baud rate for the program. I am not sure that 300 baud should be burned into the program. I will trust your judgement, but shouldn't 1200 be used to be compatible with the Ottowa group? I have a 300 baud modem, but probably will borrow a 1200 baud one, until I build the XAR 2206/2211 modem. Larry is having me hold off on that score until they figure out the proper filtering for it's receiver. The ADM 3A will go at that rate(and higher) so I will trust your judgement as to the correct baud rate. I had not done the modification to use the 4040 divide by 12 circuit, so let's go with the rate that is used by everyone else.

At present, there are only a few of us in the Schenectady area that are working on this, however, the momentum is growing. In my case, I will be building my own ADM like CRT terminal from parts off the surplus market. (The ADM is on loan from work.) It's interesting, but slow.

Thank you for offering to burn the chips. If or rather would you please let me know what I owe you and I will send a check. Meanwhile, I will get the preliminary checkout work going on the board and get it to the point that if required, I can send it up to VE3QB for final checkout before we try it on the air. Hope some day to get through to KA6M too!

73 for now, and thanks for your help. I wouldn't have gotten as much done as I have without it.

Sincerely yours,

William Patmos

William Patmos, W2DHT

JEB BOSWELL, M. D.
29 KENILWORTH STREET
NEWTON, MASSACHUSETTS 02158

AREA CODE 617
TELEPHONE 969-2740

10-14-81

Hank Magnuski, KA6M
311 Stanford Avenue
Menlo Park, California 94025

Dear Hank,
well, at last some of us will make the Conference (Hope you get a decent airfare.)
The name selected here for the repeater is "HUBNET" — Boston is known as "The Hub" — and "Hub" is used in that connotation.
Frequency will likely be in the 144.9 to 145.1 area - all others are in use.
The rcvr (because ATX-10), power supply, and antenna were obtained at a recent flea market.
The boards are used and are in process.
Will take you up on one 8273 at $35.00 and the packet repeater eP/M disk + schematic at $75, which makes for $110 + $4.00 S&H, to total $114.
The other parts and IC's are either on hand or ordered.
May need a second 8273, depending on my success.
Hope you enjoyed the conference.

73

JEB

W1YO

Sent 11-20

Date: 12 Oct 81 22:30 PDT
To: John Gilmore
From: Hank Magnuski

In answer to your many questions:

1. Yes, the modem is the CERMETEK evaluation kit. I can now talk to the DG with it, but have trouble with the repeater. There are still problems with the Carrier Detect circuit which need to be resolved. I am about 90% confident that it will eventually work, possibly with some additional outboard circuitry to get around this last problem.

2. It would be nice to go faster than 1200, but no standards yet exist. Sooner or later we'll find some of the causes for all the delays, and shorten some of them.

3. Everybody has suggestions for improving the VADCG boards, but nobody wants to sit down and redesign it. It's easier to criticize than contribute, and I give the VADCG people a lot of credit for cutting into new territory. With Doug leaving I suspect things will be a little slower up there.

4. The parallel/serial traces are the same at the 25 pin socket. I think you can intercept them earlier and use both chips.

5. Yes, I put together a DEBUG for the VADCG. It's VDBUG.ASM in this directory, and comes from an INTEL SBC debugger. Requires one 2708, 0000H to 03FFH.

6. The VDBUG allows you to load pieces of tip or lip into RAM.

7. I'll take any DG software you have. I appreciate and can use just about [illegible]

8. The idea of using a screen editor, or even any editor over the air is the wrong approach. One edits his files on his home system, using a favorite, comfortable, fast, editor, and then sends the file to the DG for dispersal.

9. Any ID you wish to use is OK with me, just keep it the same.

10. There are lots of old XTAL transceivers coming on the market as hams [illegible] to the fancy synthesized ones. Around $100 is right. I am not planning to sell my units. I assume your arrangements for a call will be legal [illegible] particularly want to get into supporting bootleg type operations.

11. Packets through the repeater have additional intervening F[illegible]. The new rev 2.12 will have 4 FLAGS before and after each packet (8 [illegible] two packets).

12. Well, I really appreciate your offer to help kick around some of the design ideas. Maybe we can get some fires burning around here.

See you later, Hank

October 12, 1981

Mr. Hank Magnuski, KA6M
311 Stanford Avenue
Menlo Park, CA 94025

Dear Mr. Magnuski:

I read your letter in the August issue of the AMRAD Newsletter in which you mention your work with Bell 202 - series data sets. I have a 202E data set that I purchased at a hamfest, and I would appreciate it if you could answer some questions about it for me.

1. Can this data set be used as a 300 - baud originate - only modem for communicating with computerized bulletin boards?

2. If so, would you know where I could get schematics and other technical information?

3. If not, do you know of anybody who would be interested in buying it? I have not tested it as a modem, but I have established that it works as a telephone.

I would be grateful for any help you can give me. I am enclosing a stamped self - addressed envelope for your reply.

Sincerely yours,

Charles E. Cohn

Charles E. Cohn, KB9XV
445 Ridge Avenue
Clarendon Hills, IL 60514

Reply 11-9-81

"AMATEUR RADIO STATION KA6GWZ"

AMATEUR RADIO STATION KA6*
MR. HENRY S. MAGNUSKI
311 STANFORD AVENUE
MENLO PARK, CA. 94025

OCTOBER 12, 1981

DEAR MR. MAGNUSKI:

A FEW LINES TO LET YOU KNOW THAT I AM INTERESTED IN 'PACKET' RADIO COMMUNICATIONS. HOWEVER, I AM NEW TO THIS MODE.

I HAVE APPLIED TO THE F.C.C. CONSUMER ASSISTANCE FOR SPECIAL PERMIT.

ALSO HAVE JOINED THE VANCOUVER DIGITAL COMMUNICATIONS GROUP AND THE AMATEUR RADIO RESEARCH AND DEVELOPMENT CORPORATION.

IT IS MY INTENTION TO FOLLOW THIS 'PACKET' MODE AS IT DEVELOPS FOR AMATEUR RADIO USE.

73

Bill Poynter

'BILL' POYNTER
1181 FREDKIN DRIVE
COVINA, CA. 91722

Packet 11-9-81

Date: 11 OCT 1981
To: All packet stations
From: Hank, KA6M

At the request of W6FFC, [illegible] repeater has been removed from its Los Altos Hills location. [illegible] stated "After extensive [illegible] with my wife I am implementing her [illegible] that no unattended equipment, particularly the packet repeater, be left on during my absence."

So I thanked Irv for his generosity thus far, and am now in the process of trying to establish a new site for the machine.

Hank,
I tried sending the same 70K file now that you've enlarged the
ring buffer, but it apparantly still overflows when going direct.
Any other ideas?
-- David

TO: HM
FROM: PRNET DML
SENT: 10 OCT 81 10:16:38
READ: 10 OCT 81 13:08:44

Hello,
We have a couple of spares right now and your prices aren't too
different from local distributors' 25 lot prices so we are probably Ok for a whi
I will call Don as soon as I finish here and get back to you with his answers.
The only thing that might take more than a few days to do would be the artwork,
as we are still waiting for the drill list.
Thanks, John VE7ADE.

Oops, forgot that this mail system is not intesrated into the files in the packet directory -- thus you didn't know who i was lossins in as. (John Gilmore here asain). I'm usins 8642891Js on Curt's sussestion; shorter improvements are welcomed (GNU is my usual DG loson name).

Can you sussest a reasonable, cheap transceiver for packet use? It doesn't need to be able to do anythins else, as far as I'm concerned. It'd be nice if the PTT didn't require a lot of interfacins. You mentioned wantins to upsrade the repeater's transceiver -- would your current one be OK for my uses, and do you want to sell it?

The discussion at the meetins mentioned that packets soins thru the repeater have lonser headers than those that don't. Is this true, and, if so, why? What's the extra info, and where is it?

Add me to the list of people interested in workins on the network desisn. I won't have any time before November, thoush, as I'll be attendins APL Standards Meetings and the APL Users Conference til then, and consultins.

-- reflection, from now on I'll sive "GNU" as my call sisn after losin. It's just as sood as 8642891Js, and easier all around.

Later...

-- John

TO: HM
FROM: LSK
SENT: 09 OCT 81 08:39:32
READ: 09 OCT 81 12:25:25

To Doug, VE7APU
Copy Hank, KA6M
Paul, W4RI
Doug - I have just this morning received the keys and access to our old (and soon to be used again) microwave site at KALADAR, Ontario. It is 100 plus miles out of Ottawa, and will mean we only need one more site in the Lindsay - Peterborough area and you should be able to reach us direct from Toronto. We are going to put our 9600 bps system in there for tests and if it works surely something lower speed will be OK as well. I have just run the path from VE3TEL here on this buildings to Kaladar and it looks good for the 222 Mhz. There will be some fading but we can live with that. I hope you can get into something decent wise in Toronto so that you can get to us with only one more repeater. Please ack this message and let us know how you are making out. Regards
73, Larry, VE3OP

TO: HM
FROM: LSK
SENT: 09 OCT 81 08:39:32
READ: 09 OCT 81 12:25:25

To Doug, VE7APU
cc Herk, KA4M
Paul, W4RI

Doug - I have just this mornins received the keys and access to our old (and soon to be used asain) microwave site at KALADAR, Ontario. It is 100 plus miles out of Ottawa, and will mean we only need one more site in the Lindsay - Peterborough area and you should be able to reach us direct from Toronto. We are soins to put our 9600 bps system in there for tests and if it works surely somethins lower speed will so ok as well. I have just run the path from VE3TEL here on this buildins to Kalader and it looks sood for the 222 Mhz. There will be some fadins but we can live with that. I hope you can set into somethins decent wise in Toronto so that you can set to us with only one more repeater. Please ack this messase and let us know how you are makins out. Resards
73, Larry, VE3OB

Date: 08 October 1981 14:50 PDT
From: Hank Magnuski @ KA6M
To: John Spraggs VE7ADE @ VE7PKT

I have found that by having some extra parts around you can frequently make sales to impulse buyers. If people have a chance to think about it, they frquently get waylaid doing other things. Thus I think 5 sets for your group is a liitle on the low side, but will supply you with that many if you want.

I am still short of the followings:

5 sets of documentation for the 5 boards shipped directly from the PCB place.
1 set of master artwork
10 boards + 10 sets of docs which were supposed to be sent on a new order.

Please ask Don about the status of all this if you can. I have eager buyers waiting!

The conference is on the 16th of October.

TO: HM
FROM: DML
SENT: 08 OCT 81 00:52:50
READ: 08 OCT 81 08:24:49

Hank,
I've discussed it with the rest of our group and they don't feel ready to prepare a complete kit for a group purchase, which was what I had in mind when I asked about 25 each. We would like five of each for now.
Perhaps you should take a few more of them to the East as [illegible] ing some of our boards there to distribute on spec. He may also be interested in getting some for the Toronto area.
I haven't heard from him for a while, so when you see him, encourage him to find a modem and sign on here or call me on the tie-line. When is the meeting, I've forgotten now.
John

TO: HM
FROM: DML
SENT: 08 OCT 81 00:52:50
READ: 08 OCT 81 08:24:49

Hank,
I've discussed it with the rest of our group and they don't feel ready to prepare a complete kit for a group purchase, which was what I had in mind when I asked about 25 each. We would like five of each for now.
Perhaps you should take a few more of them to the East as Doug is taking some ten of our boards there to distribute on spec. He may also be interested in setting some for the Toronto area.
I haven't heard from him for a while, so when you see him, encourage him to find a modem and sign on here or call me on the tie-line. When is the meeting, I've forgotten now.
John

TO: HM
FROM: LSK
SENT: 06 OCT 81 14:53:14
READ: 06 OCT 81 16:39:40

TO KA6M
VE7APU
[illegible]

WE HAVE BEEN REVIEWING OUR MESSAGE OF 19811005 AND WHILE WE SEE THE LINKING REPEATER CONCEPT AS EXPRESSED ESSENTIAL TO US WE ARE SENSITIVE TO THE PROTOCOL NEEDS AND SUGGEST THE FOLOWING:

WE HAVE NO DIFFICULTY WITH A CENTRALIZED INTELLIGENT REPEATER/CONTROL STATION SUCH AS WE VIEW KA6M BEING AT THE MOMENT WITH SERVING LINKING REPEATERS AS WE DESCRIBED PREVIOUSLY. THE EXTRA LOADING OF TRAFFIC INTO/OUT OF A CONTROL STATION VIA A LINKING REPEATER INTERFACE TO THE INTERMEDIATE USER SEEMS A SMALL PRICE TO PAY FOR A SIMPLER AND HOPEFULLY MORE RELIABLE REPEATER IN THE ISOLATED AND HOSTILE ENVIRONMENT.

WE CURRENTLY SEE THE DISTINCT POSSIBILITY OF LINKING REPEATERS BEING BATTERY/SOLAR POWERED TO TAKE ADVANTAGE OF SITES AVAILABLE BUT WITHOUT POWER OF ANY KIND. WE HAVE SOME COMMERCIAL EXPERIENCE IN THIS AREA AND WILL BE PLAYING A STRONG ROLE IN THIS AREA AFTER THE BASIC SYSTEM IS IN PLACE.

OUR CURRENT EFFORTS AT OBTAINING A COPY OF THE INTERNET PROTOCOL SPECIFICATION HAVE BEEN WITHOUT RESULT. COULD YOU SEND ME A COPY? IF SO - L. S. KAYSER, 403 THIRD AVE, OTTAWA, ONTARIO, CANADA - K1S 2K6.

[illegible]
SUFFICIENT AGREEMENT TO NOW ASK THE QUESTION OF WHO IS GOING TO DO WHAT AND WHEN?

HANK, ARE YOU IN A POSITION TO EXAMINE INTERNET IN A CONFIGURATION OF TERMINAL AND LINKING REPEATERS WHILE SUPPORTING LOW VOLUME USERS ACCESSING VIA A LINKING REPEATER? NORMAL ACCESS FOR THE MAJORITY OF USERS WOULD BE VIA THE TERMINAL REPEATER. THE TERMINAL REPEATER THEN WOULD BE THE INTERFACE FOR OSCAR, HF VHF, OTHER.

COMMENTS FROM THE GROUP PLEASE.
REGARDS
DE LARRY, VE3QB

TO: HM
FROM: LSK
SENT: 05 OCT 81 19:47:17
READ: 05 OCT 81 20:34:00

TO KA6M, HANK
VE7APU, DOUG ET ALL!
W4RI, PAUL
SUBJECT : VHF DIGITAL REPEATER NETWORK
FURTHER TO YOURS OF 19810917
NOTE - HANK I HAVE BEEN HAVING A ROUGH GO OF IT FOR SOME DAYS
NOW - NO HEAT IN THE HOUSE AND IT IS GETTING COLD , BUSY AT WORK
ETC - HOWEVER I HAVE NOW ALMOST FINISHED AN ELECTRIC CONVERSION
OF MY FURNACE AND MOST OF MY EQUIPMENT IS WORKING AGAIN AFTER AN
OLD BUT STILL CONNECTED HOT WATER TANK BLEW UP ALL OVER EVERYTHING
IN THE LAST 10 DAYS OR SO.

FIRST WE AGREE THE CREATION OF A NEW MODEM IS BEYOND OUR CURRENT
EFFORT INTENT. WE CAN RETRO FIT MODEM AND SPEED ON REPEATERS RELATIVELY EASY
AS WELL - AT LEAST NO MORE DIFFICULT THAT DUAL FREQUENCIES WOULD BE.
ENOUGH SAID.
PROTOCOL WISE - INTERNET SPECIFIC - WE HAVE NO TROUBLE WITH - PROVIDING THE
NEXT ISSUES IS RESOLVED! A LATE NOTE INSERT - WE HAVE JUST LEARNED THAT
THE MONTREAL GROUP IS GOING TO CONVERT TO AN SDLC FORMAT/PROTOCOL
IN THE NEXT YEAR. THIS IS A COMPLETE REWRITE FOR THEM.
LINKING REPEATERS, AS DISTINCT FROM (POSSIBLY) TERMINAL REPEATERS ABSOULUTELY
MUST MEET THE FOLLOWING CRITERIA.
A) 1 (ONE) CUBIC FOOT IN SIZE - TOTAL (RADIO,MODEM,MICRO,PWR SUPPLY)
B) SINGLE BOARD COMPUTER 8080/Z80
C) PROBABLY 8K EPROM/8K RAM
D) MUST BE POSSIBLE TO OPERATE IN HOSTILE ENVIRONMENT-
VARIABLE SUPPLY VOLTAGE, OF TO 140F, 0 TO 100%
HUMIDITY (NON-CONDENSING) ETC.
EPROM COULD BE EXPANDED TO ACCOMODATE PASCAL BUT IT MUST BE
ROMABLE CODE. WE WOULD PREFER UCSD PASCAL OVER OTHERS BUT WE COULD LIVE
WITH A&M OR MICROSOFT FORTRAN FOR WHICH WE HAVE OUT OWN SMALL
RUN TIME PACKAGE.

FRANKLY $=!00 WITH DYNAMIC RAM OR ANY FORM OF MECHANICAL STORAGE IS
BEYOND DISCUSSION FOR EITHER OUR POCKET BOOKS ($) AND THE SITES
WE ARE CONSIDERING GOING INTO. THESE ARE 100 TO 200 MILES OUT, OR MORE,
LIMITED ACCESS (1 OR 2 TIMES PER YEAR IN GOOD WEATHER) ETC.

WE HAVE HAD EXCELLENT SUCCESS WITH OUR REPEATER USING AN EPROM BASED
"BOOT" PROGRAM THAT SUPPORTS DOWN LINE LOADING OF THE OPERATING PROGRAM
AND WE COULD SUPPORT SUCH A CONCEPT FOR LINKING REPEATERS AS WELL.
WE ALSO RECOMMENT THAT LINKING REPEATERS BE ABLE TO SERVE LOCAL USER-
INTEREST AND PREVENT RESENTMENT AND EXCLUSION OF LOCALS WHILE SEEKING THEIR CO-
OPERATION IN SIGHT SHARING ETC.
OUR POTENTIAL SYSTEM - FROM OTTAWA LOOKS LIKE THIE - PLEASE REFER TO AN
ADEQUATE MAP

AWA - TORONTO
FIRST REPEATER - KALADAR MICROWAVE SITE, 100+ MILES
SECOND REPEATER - PETERBORO AND UP TO 30 MILES WEST
200+ MILES

OTTAWA - ALBANY, NY
FIRST REPEATER - TUPPER LAKE, NY 100+ MILES
SECOND REPEATER - MIDDLE TO LOWER 1/3 VERMONT 200+ MILES

I SUGGEST THAT PROTOCOL THEN BECOMES ONLY AN ISSUE TO MEET THESE
OBJECTIVES AND TOTAL SYSTEM COSTS NEEDS OF IMPLEMENTORS
USE OF MORE MEMORY IS NEGOTIABLE BUT I SUGGEST WE STRUGGLE
WITH THE (OUR VIEW) ESSENTIAL NEED FOR A SIMPLE REPEATER AND
THE INTERNET PROTOCOL BUSINESS TO A RESOLUTION.

PLEASE REVIEW WITH YOUR GROUP AS WELL, AND ADVISE. WE SEE
A BEED FOR VIRTUALLY A CONUS WIDE VHF COVERAGE BY THE
LATE 1980'S

SORRY FOR THE DELAY IN GETTING THIS OUT - BUT AT LEAST I HAVE A
FEW THINGS WORKING HERE NOW. REGARDS HOPE TO HEAR FROM YOU ALL SOON
LARRY VE3QB

Hank,

I was just calculating what the effective baud rate of packet (our packet) was with the idea of coming up with an overall formula which would show the effects under various conditions. There are some variables which I'm not sure about and I'd like to discuss this with you sometime to see if my calculations are correct. Incidently, my figures show that including the ack from the receiving station, to send one packet of 128 bytes of text at 1200 baud, assuming negligible transmitter turn-around time, going direct, the effective baud rate with average delay at each end (of 700 ms) is 604.7244 baud.

Jeff

Hank,

I am surprised you don't have handshaking set up from your Vancouver board to the Data General; I am still at a loss to understand why I am unable to transfer a large file to you, however. Assuming you have at least a 1200 baud path to the DG, and that any DG processing would be rather insignificant under normal conditions, I wouldn't think any handshaking would be necessary at your end.

In order to slow things down more than 1/2, I transfered the same file (a modem program I'm using modified for packet use which is 70K source code with tabs expanded) through the repeater. This results in well under 600 baud average transfer rate. In fact, this will amaze you: (?) It took close to 70 minutes to transfer the 70K file (convinient, eh?), which comes out to about 170 baud average transfer rate. This was due, no doubt, to a number of re-tries. The result is that this time I was able to transfer about 47K of the file before I was dumped by your DG. But why was I dumped? Why didn't it just ignore the incoming data during buffer overflow?

So, it is hard to imagine that slowing the output down at my end, when even an average rate of 170 baud didn't work, is the answer. Let me ask some questions:

1) What baud rate are you using to your DG?

2) What is reason for the overflow at your end? Is the DG involved in number crunching or something that really locks it up for long periods of time? I don't notice that particularly under other conditions.

4) Haven't other people transfered large files to the DG? How did Cal transfer his Tip source to you?

5) Is it really possible that your DG can't sustain an average of 170 baud input? If so, how hard would it be to set up handshaking between your Vancouver board and the DG similar to what [illegible] and I imagine others have done between our host computers and TNC's?

-- David

To: John Spragge, VE7ADE
Fm: Hank Magnuski, KA6M
Date: 02 OCT 81

John, thanks for your note and welcome to the net. Some useful chit-chat has gone over these wires.

No, I would be happy to supply you with 25 sets of chips. Let me know how and where you want them delivered. I could give them to Doug or someone from CANADA at the October 16th Network meeting in Washington if that's convenient. Or I could mail them to you or Seattle or whatever costs the least in terms of customs duties. Just let me know.

Yes, the VADCG boards have been very popular here because they work well and are easy to put together. Am sending you the latest listing of our users.

73, Hank

TO: HM
FROM: DML
SENT: 01 OCT 81 20:50:31
READ: 02 OCT 81 08:31:08

Hank,
I think we could probably use some of your chips. Would 25 of each put too big a dent in your supply? (It has been on my mind that we should probably try to get at least a minimal chip set together now that we have the new batch of boards. Maybe we could also get together on a group memory purchase as well. Doug did most of the digging the last time and I'm not sure now of all his sources.

As you can tell I am using Doug's ID and I guess I am now the voice of Vancouver Doug and I will be having fun checking the DML ID to read old mail from each other.

I think I will send a copy of this to myself to see if that will work.
What is the state of your network activity now? That is, how many active users?
We are waiting the return of our artwork package so we can get the master drill instruction sheet back. Then it will be ready to send to you.
73's John Gerpheide VE7AEE

FROM: PRNET DML
SENT: 01 OCT 81 21:21:53
READ: 02 OCT 81 08:31:35

Hank,
I just found ** PKT.USERS, which answers one of my previous questions.
How are you guys going to town in a hurry! I'm impressed. I will pass it on to Don Oliver and maybe he can check it against our mailing list.
CUL, John

Oct. 1, 1981

Dear Hank,

I am interested in obtaining a V.A.D.C.G. Packet Radio Controller board and more information about Packet Radio.

I currently have a Central Data 2650 Computer System which I can configure as a RS-232 Type Terminal plus a 1200 Baud Modem, and I am very interested in getting involved in Packet Communications.

Any information you can send would be greatly appreciated.

Thanks & 73

Vince Staffo
WB2FYZ

10 Monroe St
Ilion, NY 13357

12-3-81

Hank,
I am having troubles with the "COPY FILENAME @INPUT" with really large files. I tried a couple times entering a 70K file, and both times I was aborted at the DG end before the file finished and put back in the command level. Any ideas what might be going on? Is there any limit on how large a file can be transfered that way? (assuming enough disk space?) Is there anything besides a control-control-D that will get one out of the copy input mode?
--- David

1005 East Third Avenue
Apartment B
Escondido, California 92025
23 September 1981

Henry Magnuski, KA6M
311 Stanford Avenue
Menlo Park, California 94025

Dear Mr. Magnuski:

The Vancouver Amateur Digital Communications Group (VADCG) has informed me that there is a packet radio repeater operating in the San Francisco Bay area under your callsign, and so I am writing to you for information about your repeater because I am trying to stimulate some interest in packet radio in the Escondido area.

My questions about the repeater are summarized as follows:

- was any special FCC approval required for the operation of the repeater and its license? was it also required for the terminal nodes? are there any other special licensing and/or operational considérations?

- is CW identification required for the repeater and the terminal nodes? how is it accomplished? does it present any problems for the network or have an adverse effect on its operation?

- general network information:
  - what is the repeater's coverage?
  - how many users are there in the network?
  - what is the typical terminal node hardware configuration (RF and digital)?
  - what is the typical repeater loading?

If your are unable to provide me with this information would you please forward this letter to someone who can provide this information. Thank you for your assistance.

Sincerely yours,

Michael H. Stockett, WA7DYX

9-30-81

TO: SF Packet Stations
FROM: Doug Lockhart, VE7APU
SENT: 19 SEP 81 11:57:20
READ: 20 SEP 81 19:48:08

Hank,

I got your message and arranged for 10 more boards to be sent to you. Send the $250 for the boards to Don Oliver, VE7AOG. The documentation will besent separately from the boards. You should have received the five boards you were lacking by now.

After the mail strike ended here and the post office got caught up with the backlog, we got your letter ordering a copy of the art work for the boards. The letter was mailed early in the strike when the U.S. was still sending the letters on to Canada instead of returning them. Don Oliver is arranging to get you a copy. Now that the original artwork has

is going to be returned to us from the PC manufacturer in Washington state.

I have been very busy of late. I am being transferred to Toronto by IBM on a new job. I am selling my house here and getting new accommodation in Toronto. Most of my free time in the last few weeks has been spent working on getting the Anik-B satellite link going between Vancouver and Ottawa. I will probably be very unsettled and busy for the next couple of months as well.

I will be continueing my activities in Amateur Packet Radio from Toronto. Toronto appears to be virgin territory for packet radio. I have heard nothing of activities there even though there is a lot of activity in Hamilton which is only 40 miles away.

Thanks for sending along the information via Tymnet. I appreciate it even though I have been hard pressed to reciprocate much so far. I will pass along some things as soon as I come back on my House-Hunting trip to Toronto. I am flying there in a couple of hours.

73, Doug

ALL MESSAGES READ

@

-1072-002-
Please log in!
!User name!
>PRNET.HM
ZONTYME II 17 SEP 81 15:24:28 GMT

GO
!READ ALL
ID?
KEY?
ACCEPTED

MSG#!X90368
IN#! 19
TO! HM
FROM! PRNET LSK
SENT! 15 SEP 81 13:16:07
READ! 17 SEP 81 08:24:29

To KA6M,W4RI,VE7APU
From VE3QB, Larry
#1 The Ottawa Group are desirous of setting up extended VHF digital links from Ottawa to Toronto and Ottawa to (at least) Albany NY. Each path is in the area of 300 miles.
#2 Each link will require two or three isolated repeaters. These repeaters must be simplex RF, single board micro (hopefully VADCG), MODEM (probably the Montreal EXAR based unit) and a suitable power supply.
#3 We need information ona suitanble software package that can compliment a common direction for such activities in North America.
#4 HM - This is what prompted my message to you previously about our direction for the future. We are prepared to do some development on this but we do want to get going this winter for implementation next spring.
#5 We have no problems with a datagram approach providing the layering is well defined - the critical question is that we get going on the implementation in the next two months.
#6 Comments please - especially from those who will work on the project with us to get it all going (at once!!!)
de Larry, VE3QB

ALL MESSAGES READ

Date: 17 SEP 81
From: Hank, KA6M
To: Larry, VE3QB

Subject: VHF digital repeater network

Thanks very much for your notes concerning the proposed repeater network. I agree 100% with you that a common direction is needed and that total system compatibility is both desired and necessary. I would also second the thought that sharing the development work and trying to use common hardware/software pays off. The widespread use of the TNC and the several different software contributions made to it has greatly benefited many of us, particularly here in the Bay area.

1. We are seriously thinking about a second repeater in this area, primarily to service the north bay users. Thus we, too, are considering the problems of running tandem repeaters and may be soon starting some tandem experiments.

2. We all love the Vancouver TNC. It's the greatest thing since apple pie. However, we have come to the conclusion that in its present form it is unsuitable for higher level networking and higher level protocols. There are two approaches to using it in a higher level environment:

   A. Redesign the unit to support some complement of 64KB of RAM/EPROM. Maybe design in a Z80.

   B. Primitivize the operations on the board and use an attached larger computer to do the protocol work. The VADCG is relegated to doing packet I/O and the real decision making and processing goes on elsewhere.

3. There is currently only one viable alternative to using/extending/redesign-the VADCG, and that approach is based on using the STD hardware on which the KA6M repeater is built. The packaging and Z80 are very attractive. The control software is already in PASCAL. The memory space is there. The price is a little more than one wants. Doug's new S-100 board with an S-100 Z80 might be another possible route. We would be happy with an S-100 based design.

4. The 202 modem has become firmly entrenched here, and is capable of handling our current traffic load. A high speed modem design effort is needed, but I would rate that as a second level priority.

5. I have not heard many comments for/against INTERNET. Does your group have any suggestions concerning its adoption?

6. There are as yet few hams who are up to speed in packet, and the available labor pool is still quite small for really ambitious efforts. Many of our group are still in an educational mode, and involved in getting their stations to work.

In conclusion, I think we should first make some decisions on the environment: what CPU (8080/Z80/?), how much memory (RAM/EPROM), and what language (ASM/PASCAL/C/FORTH/?) can be expected to be used in a repeater node.

73, Hank

TO: HM
FROM: LSK
SENT: 15 SEP 81 13:16:07
READ: 17 SEP 81 08:24:29

To KA6M,W4RI,VE7APU
From VE3QB, Larry
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#6 Comments please - especially from those who will work on the project with us to get it all going (at once!!!)
de Larry, VE3QB

Date: 14 Sep 81 23:15
From: Cal
Subject: TIPM03.ASM
To: Hank

There are a couple of minor points which probably should be checked before the new version sets wide distribution:

1. In the RST55 routine, the sequence to check CTS change

```
        ORA     A       ; CTS ?
        JZ      TXINT   ; yes, continue tx service
```

   probably should be placed AFTER the checks for receiver buffer full and transmitter buffer empty, since they will be more likely. This would speed up interrupt processing slightly. Minor difference, but that section of code is entered for EVERY 8251 interrupt. Somehow I had it in my mind that the CPI's would modify the value in A so that the ORA A couldn't be used after the CPI's, which is nonsense. Must have been late at night when I put that one in.

2. I did not get around to implementing WA6RZW's suggestions, particularly the one concerning checking the input pointer BEFORE depositing the new character from the receiver. I'm not sure that they apply to the version of TIPM that I started with, and I have never experienced any problems with input characters being lost. But then, I am running the host-to-Vancouver board link at 2400 baud, so I might never see the problem anyway. Should that section of code be included in the present TIP program?

   (I think my version of the ^S-^Q code is more or less equivalent to his, and there are some differences between the 8251 and 8250 hardware anyway, especially when the CTS sensing is included.)

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   (I think my version of the ^S-^Q code is more or less equivalent to his, and there are some differences between the 8251 and 8250 hardware anyway, especially when the CTS sensing is included.)

Cal

Date: 12 Sep 81 00:37
From: Cal, K6HWJ
To: Hank, KA6M

TIPM03.DOC and TIPM03.ASM now on the DG disk. Averase transfer rate was about 24 chars/sec (240 baud), based on 24148 chars in 16:47.
Let me know if you have any problems assemblins the code. I think that most of the buss are out by now. Good luck.

Cal K6HWJ

Date: 10 Sep 81 23:55
From: Cal
Subject: TIPM.ASM
To: Hank

I have been working on the code a little each evening, and I think it looks fairly good now. I incorporated almost all of your earlier suggestions as well. The current version was burned about an hour ago, but the bugs have gotten smaller each time, so I hope this one is pretty close. I still need to use it a little more before releasing it, though. In response to your suggestions:

1. The echoing of BS-SPACE-BS or '_' for DELETE is now determined by an assembly option which is the argument to an IF statement. BS always echoes BS-SP-BS.

2. If the automatic CRLF option is on, CR does indeed send a LF as well. This is convenient for talking to other stations, but not to the DG. However, I changed the default to initialize that option OFF, so it starts up the same as the current TIP -- CR and LF are completely separate characters.

3. I put a check in so that no zero-length packets are sent.

4. My feeling about the higher-level protocol software is that it ought to be done in the host computer to which the Vancouver board is tied, and DEFINITELY in a higher-level language than assembly (such as C or Pascal). It should be in a language which compiles to bits, though, to keep the execution speed up. If there really is a need for 8K of ROM, it may be possible to patch the Vancouver board to use four 2716's. This might require adding another address decoder, since the RAM's are still in 1K chunks, but it might not be too hard to do. I wouldn't mind seeing a complete redesign, using much more RAM which could be downloaded, and perhaps a Z80 instead of the 8085, since the Z80 generates refresh addresses for dynamic RAMs automatically. The price of 16K chips is very low these days, and even 64Kx1 dynamic RAMs are under $9.00 in unit quantities now. Like everyone else, however, my time is limited, so I'm not volunteering (yet) to do the design, although I do have some ideas on it.

5. As soon as I'm sure the code is firm, I'll edit the TIPMKEYS.DOC file.

6. I worked a little more on the flow control interface, although there may be some original code still there which isn't necessary now. When the input should be shut off, RTS is lowered as well as sending ^S; RTS is raised when the input should start up again (as well as ^Q being sent). However, if the "No Special characters" is on, the ^S and ^Q are NOT sent -- ONLY the RTS signal is used. The only reason I can see for the "NS" option is for binary files, and the control characters might get in the way. This section of the code is easy to change if it is necessary. Also, lowering CTS will stop printout; raising CTS starts it up again. Again, if "NS" is on, ^S and ^Q from the keyboard have no effect, but if "S" is on (default), ^S and ^Q work about as they now do. Another change: ^S and false CTS now instantly stop output, instead of waiting for end of line. This involved a little more logic, since it's possible to get the interrupts from the outside permanently stopped if you're not careful. I wound up using the modem control interrupts as well as TX and RX, since that's the only way to sense CTS if the TX stream is shut off. It really didn't add much code, though. I didn't do anything about raising DTR to indicate station connection, since that involves digging deeper into the LIP

than I wanted to do this first pass.

7. I added another function, ^^I, which does a software Initialization (ie reset). This just jumps to location 0, which is almost the same as a hardware reset, except that the hardware reset may do additional things to the peripheral chips. Still, it's convenient for aborting a connection attempt before it times out, and for other things as well, assuming the program is still alive.

8. Even knowing DG, I can't believe those turkeys would design the terminal that way!!! Yes, the special character (^^) is 1E, but it's defined by an EQU and always is referred to by its symbol, so it can be changed easily. Do you think it's worth making it a soft character that can be changed at run time (like the first character received after a reset)? My feeling is that it's not, just let the user assemble it in as a constant.

I will try to see if there are any more bugs left, and will probably transfer the code in the next day or two. I haven't had time yet to check into the ATS link.

Cal

JEB BOSWELL, M. D.
29 KENILWORTH STREET
NEWTON, MASSACHUSETTS 02158

AREA CODE 617
TELEPHONE 969-2740

9-8-81

Hank Magnuski, KA6M
311 Stanford Avenue
Menlo Park, California 94025

Dear Hank,

Your Packet Repeater package has been received.

As a member of the SMUDGE (Slightly Mad Users of Digital Group Equipment) section of the New England Computer Society, I have an interest in Digital Communications. The SMUDGE group is a very active bunch of happy hackers, both hardware and soft ware types, with 40 active members - many are amateurs.

Somehow, I have been delegated to get a packet repeater going .... or else. (What "else" is, is unknown.)

REPLY 10-8-81

JEB BOSWELL, M. D.
29 KENILWORTH STREET
NEWTON, MASSACHUSETTS 02158

AREA CODE 617
TELEPHONE 969-2740

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Somehow, I have been delegated to get a packet repeater going .... or else. (What "else" is, is unknown.)

REPLY 10-8-81

Incidentally, several of us are working on a repeater control computer using the STD-bus and Z-80.

The Amateur Gear here is capable of SSB, AM, CW, RTTY, SSTV and FM from 160 meters to 40cm except 6 meters.

One computer (an old 8008 unit) has been retired. Two Z-80 Digital Group computers are up and operating. An S-100 is in assembly.

So the capability is here.

Other committments will prevent my attendance at the October 16th meeting in Gaithersburg, Maryland.

Would it be possible, then, to obtain your circuit for the STD bus and the software? I would hope that the software would be available on an 8" CP/M Disk....

A number of people are looking for the Bell 202 modems- the old standard Hand Held is working-

I am looking forward to setting up and using the Packet Radio concept.

Please accept my thanks for your help

73,
JEB
W1YO

P.S. I enclose a cheque for $70 for 2 of the TNC boards.- since you are listed on the flyer for them -

J

I READ WITH INTEREST AND CONSIDERABLE APPROVAL YOUR RECENT TIP MODIFICATIONS. THE ESCAPE SEQUENCE IS VERY MUCH NEEDED WHEN INTERFACING TO EXISTING COMPUTER SOFTWARE. THE CHANGES IN CONTROL CHARACTERS, THE ADDITIONAL COMMANDS, AND THE IMPROVEMENT ON THE CALL LETTER ADDRESSING ARE WELCOME IMPROVEMENTS.

I READ HANK'S NOTE BACK TO YOU AND I HAVE A COUPLE OTHER THINGS THAT MIGHT BE DESIRABLE. I'D LIKE TO SEE A WAY OF DOING A SOFTWARE RESET .. SEEMS LIKE IT SHOULD TAKE ONLY A FEW BYTES FOR THAT. THAT WOULD ALLOW ONE TO ESCAPE FROM AN ATTEMPT TO MAKE CONTACT, ETC. ANOTHER ADDITION WOULD BE TO ADD IN EITHER NULLS OR A DELAY AFTER THE CR-LF FOR TERMINALS/COMPUTERS WHICH CAN'T RESPOND AT A PARTICULAR BAUD RATE TO THE NEW LINE. (IN THE CASE OF INTERFACING TO NEW COMPUTERS, THAT PROBLEM COULD BE HANDLED WITH FAST X-OFF,ON, OR HARDWARE HANDSHAKING.)

SEEMS LIKE THERE WERE ONE OR TWO OTHER WISHES BUT THEY ESCAPE ME AT THE MOMENT. I WAS INTERESTED IN HANK'S COMMENT ABOUT RUNNING OUT OF MEMORY BEFORE EVENING GETTING TO THE HIGHER PROTOCOL. LET ME CONTINUE THIS IN A SECOND NOTE.

PART II.

NOT SURE WHERE MY MIND WAS WHEN I CREATED THAT FIRST NOTE SINCE I LEFT OUT MY CALL LETTERS, AND PUT THE WRONG DATE ON IT. ANYWAY, THERE SEEMS TO ME TO BE A COUPLE WAYS OF HANDLING THE MEMORY PROBLEM ON THE VANCOUVER BOARD. ONE IS TO ADD MORE MEMORY TO IT. WITH MEMORY BEING PRETTY CHEAP THESE DAYS, THAT WOULD ON THE SURFACE OF THINGS SEEM TO BE A PRETTY REASONABLE WAY TO GO, BUT IT APPARANTLY WOULD TAKE SOME AMOUNT OF KLUDING TO EXTEND THE ADDRESSING BEYOND THE PRESENT 8K (ROM AND RAM) ADDRESSING. RIGHT? IN FACT, I WAS PRETTY EXCITED ABOUT REPLACING ROM WITH RAM SO I COULD DOWNLOAD FROM MY HOST COMPUTER UNTIL THE MEMORY SPACE LIMITATION BECAME APPARENT.

ANOTHER POSSIBILITY IS TO PUT THE SOPHISTICATION IN THE HOST COMPUTER, BUT THERE'S A LOT OF NECESSARY INFORMATION THAT THE VANCOUVER BOARD IS KEEPING TO ITSELF. I HAVEN'T REALLY THOUGHT IT OUT VERY CAREFULLY, BUT IT SEEMS THAT IT WOULD BE POSSIBLE TO MAKE THE VANCOUVER BOARD SOFTWARE MORE PRIMITIVE, SPIT OUT NECESSARY CONTROL AND ADDRESS INFORMATION, AND LET THE HOST COMPUTER HAVE MORE OF THE INTELLIGENCE. I NEED TO BE MORE SPECIFIC, BUT WILL HAVE TO STUDY THE VANCOUVER SOFTWARE MORE FIRST. MY PRESENT INABILITY TO BURN EPROMS HAS DISCOURAGED ME FROM GETTING INVOLVED IN THE VANCOUVER SOFTWARE AT THIS STAGE.

AGAIN, GLAD TO SEE YOU HAVE MAKE SIGNIFICANT IMPROVEMENTS TO THE VANCOUVER SOFTWARE.

-- DAVID ALTEKRUSE, W6RAW, IN SAN LEANDRO

DEAR HANK,
THE VERSION II OF THE VANCOUVER BOARD IS THE ONE YOU ARE THINKING ABOUT DESIGNING? (NOT ONE THAT IS ALREADY IN THE WORKS?) I HAVEN'T INVESTIGATED THE IDEA OF SOMEHOW SUPPLYING ALL THE NECESSARY INFO FROM A PRIMITIVE VANCOUVER BOARD TO THE HOST ENOUGH TO KNOW IF IT IS REALLY POSSIBLE TO DO WHAT I WANT THAT WAY. THERE WOULD BE TWO POSSIBLITIES, IT SEEMS:

1) A VERSION WHICH WOULD REQUIRE A HOST COMPUTER AND WOULD NOT WORK WITH A STAND ALONE DUMB TERMINAL, OR,
2) A VERSION WHICH WOULD HAVE TWO MODES -- A HOST MODE AND A TERMINAL MODE.

I WOULD IMAGINE THAT A DUAL MODE BOARD WOULD BE QUITE POSSIBLE SINCE THE HOST MODE WOULD NOT TAKE UP THAT MUCH ADDITIONAL SOFTWARE, IT WOULD SEEM.

ACTUALLY, I SHOULD PREPARE OF LIST OF WHAT ALL I REALLY WOULD LIKE PACKET SOFTWARE TO DO, THEN SEE IF A SPECIAL BOARD TO HOST MODE WOULD WORK.

YOU'VE CLEARLY SHOWN THE PROBLEM A NEW INCOMPATIBLE VANCOUVER BOARD WOULD PRESENT. IT SEEMS QUITE POSSIBLE THAT A DOWNWARD COMPATIBLE VERSION COULD BE DESIGNED. GUESS I MEAN UPWARD COMPATIBLE. BUT ASSUMING THAT THE ADDRESS SPACE WAS EXPANDED, IT IS CERTAIN THAT THE ROM SOFTWARE WOULD QUICKLY EXPAND BEYOND THE PRESENT 4K LEAVING THE VERSION I PEOPLE OUT IN THE COLD FOR ANY NEW SOFTWARE.

IF ONE WERE TO DESIGN SUCH A BOARD, HOWEVER, I HOPE THEY WOULD ALLOW THE FULL 64K ADDRESS DECODING. WITH 2764 CHIPS, THERE'S 32K OF ROM IN THE FOUR SOCKETS RIGHT THERE. THAT KIND OF ADDRESSING RANGE WOULD PERMIT HIGH LEVEL LANGUAGES TO BE USED WITHOUT TOO MUCH CONCERN ABOUT MEMORY INEFFICIENCIES. SEVERAL MODES COULD BE BUILT INTO ONE SET OF CHIPS ALLOWING ADAPTING TO A LARGE RANGE OF EXTERNAL HARDWARE. BOTH ROM AND RAM PROGRAM SPACE COULD BE INCLUDED (TWO ROM CHIPS, TWO RAM CHIPS) WOULD ALLOW BOTH A STANDARD ROM TERMINAL MODE, AND DOWNLOADING FROM THE HOST FOR SPECIAL FEATURES AND MODES.

I'M NOT SURE MUCH IS DESIRABLE IN THE WAY OF ADDITIONAL HARDWARE, HOWEVER. EVEN TERMINAL BAUD SELECTION CAN BE DONE IN SOFTWARE BY TIMING THE SERIAL BITS.

I IMAGINE THAT MOST PEOPLE ON THE AIR WITH VANCOUVER BOARDS HAVE THEM CONNECTED TO HOST COMPUTERS, SO I THINK THE MAJOR CONCERN SHOULD BE IN ALLOWING THE MOST VERSATILITY IN THAT CONFIGURATION, RATHER THAN FOR THOSE USING DUMB TERMINALS. THAT WOULD SEEM TO ARGUE IN FAVOR OF A VERY CONTROLABLE, VERSATILE, PRIMITIVE PACKET BOARD. ON THE OTHER HAND, EVEN 64K OF MEMORY IS GETTING SO CHEAP THESE DAYS THAT THE COST OF PUTTING CONSIDERABLE INTELLIGENCE ON BOARD (OPTIONALLY DOWNLOADED FROM THE HOST) ALSO SEEMS VERY REASONABLE.

To Hank Masnuski
From WB6SDE (BILL) in San Rafael

Hello, Hank.. Guess this is workins, for il am typins blind.
Received your messages, thanks. I have left the satalite info here in case time permits seneratins an interest. At the moment, can only watch from a distance.
I also pulled the info on the new software from K6HWJ. Is there any way to set this code into PROM?
The letter to David resardins the S-100 board is interestins. Not sure how it f wattchins for develorment there also.
At anyrate, will check in here every once and a while.... If Woody sets a stati usins his device as a relay...?
SUL
BILL WB6SDE

TO: HM
FROM: LSK
SENT: 08 SEP 81 14:05:03
READ: 08 SEP 81 14:13:29

Hank KA6M
I am strusslins with the expansion of disital repeaters/networks around the country and the whole question of standards etc. This is soins to influence us for a lons time and we don't need any false starts - such as the 2 Meter FM thins years aso about 146.34/146.76- and we do need a misration path that can set us started towards real networks that are truly automatic and free of manual intervention. Towards this I do not under stand the intent you have for your area in areas such as
a) addressins
b) repeaters
c) modems
d) imbedded intellisence
e) time frames
f) who is soins to do the work
Maybe you could take a few minutes and lay it all out - at this point maybe you would like me to do the same. We could use this as the basis for discussions between us, and others if we can set some interest.
Resards, Larry, VE3QB

Date: 7 Sep 81 01:15
From: Cal
Subject: TIPM.ASM
To: Hank

I think I have the new version of TIPM working now (3rd version of the ROM). It's only been tested for a few minutes, but none of the sequences which caused the earlier version to crash seem troublesome now. It's somewhat bigger than the original, spilling over into the last 1K of ROM, but there is still about 3/4 K left over. (No problem with 2716's, since that extra 1K was there anyway). There is only one special character which is ALWAYS recognized: control-uparrow (^^). This seems to be a standard escape character for several of the ARPANET and BDS Telnet programs which I have used. It is purposely chosen as an "obscure" character, since it probably will be used much less frequently than the ordinary control characters. This character is used as a prefix to one or two following (non-control) characters to give the commands to the TIP program. I have retained a few of the more standard control codes as well (CR, LF, ^S, ^Q, ^U, DEL, BS). But even these can be completely disabled, leaving ONLY the ^^ as the special character, so that it should be possible to send control codes, cursor addressing commands, and even binary files if desired. A single ^^ can be sent by giving the TIP program two ^^'s in a row. I have tried to make the commands easy to remember by using the first letter of the word associated with the command, and by using an N to indicate negation.

Following is a list of the current commands (the symbol ^^ indicates control-uparrow [control-shift-6 on most terminals]):

^^^^	send a single ^^ as a normal character
^^C	Connect (the old ^X)
^^D	Disconnect (old ^Y)
^^E	Echo enable
^^NE	No Echo
^^L	automatic LF after CR
^^NL	No automatic LF after CR
^^P	force Packet to be sent
^^R	set Repeater address range
^^NR	set No Repeater address range
^^S	recognize Special (control) characters
^^NS	No recognize Special characters
^^7	mask data to 7 bits
^^8	mask data to 8 bits

The bell is sounded if an unrecognized character is seen following the ^^, and the character is ignored. Both backspace and delete are recognized as character editing commands (when ^^S is on), and they echo BS-SPACE-BS to erase the last character, except when at the first column, when a bell is echoed, as before. No checks are made for non-printing characters, so the erasure may not be perfect.

When the ^^S option is on (recognize Special control characters), LF causes a packet to be sent as before. This LF may be the result of JUST a CR, if ^^L is also in effect. Also, ^^P ALWAYS sends the existing packet, even if it is only one (or no) character(s). When the ^^NS option is in effect, the LF does NOT cause the packet to be sent; just the ^^P. (This is easy to change, if it proves troublesome.)

The alphabetic characters following ^^ can be in either lower or upper case. The default settings after a hardware reset are as follows:

^^E Echo on

```
        ^^L     automatic LF after CR
        ^^NR    No Repeater address range
        ^^S     recognize Special control characters
        ^^7     mask data to 7 bits
```

The code associated with "connection" was also changed. It is now possible to type the target callsign in lower case, and without trailing blanks. The program automatically converts the target callsign to upper case and adds trailing blanks if the call is fewer than 6 characters. So far this is done in the TIP (so that I wouldn't have to change the LIF as well), although it might be a little cleaner in the LIF. It's not bad in the TIP, however, and I don't think I'll bother moving it unless some other buss show up.

I will transfer the source file over when I am more sure that it doesn't have undiscovered buss in it. So far it looks ok, and it is very straightforward code (essentially lots of if-then-else's). It was rewritten based on my own biases, but maybe it will be useful to some of the other users also.

Cal Teague K6HWJ

Date: 6 Sept 81, 14:13
To: Hank
From: Cal

The satellite idea sounds interesting. There is a slight possibility that we could use some equipment already at Stanford. I know that there is an ATS system, since I have talked to Stanford over it from a ship in the North Atlantic, and they also use it on a daily basis to talk to Siple Station in the Antartic. I have no idea how difficult it would be to set access to it. I can ask around next week.

Do you know what paperwork is involved in setting approval from NASA and FCC ? Do we have to request authorization (in the form of an STA or some such thing) directly from the FCC ? Any idea how long the approval cycle would take ?

Date: Sept. 4, 1981
To: KA6M
From: KD6LI

Hank:

I transferred the MODEM7 software to the DG last night. Hope you find it as useful as I have. The program occupies about 9K. There are four files: .DOC describes the various functions and keys, while .SET describes a fast setup procedure for those who don't have the source code. Most likely you will want to alter the .ASM file to suit your own tastes, and it will be necessary to alter the control code sequences so they don't conflict with those used by the Vancouver software or the Data General if you use it in that application. Note that when you do a disk access, it sends a control-S to the modem serial port and expects it to stop sending characters, so it will probably scramble data if you have a long file to recieve. There are probably ways around that, which I will try to look at later. Note also that there is no filter for control-Z's, so if there is a control-Z embedded somewhere in the file you are recieving, it will appear as if it didn't get recorded on disk when you go to display it later.

73, Brian

DATE: SEPT. 3,1981
TO: HANK, KA6M
FROM: BRIAN, KD6LI

HANK --

Your check will be in the mail tonight. I looked at the spec sheet for the MK4118 and it doesn't look like it will be too difficult to modify the board to accept them. I will probably just use header extensions rather than cut traces on the board.

You must have a good parts source. I checked with Elmar today about the price of some parts today, and their prices were quite high for most things (for example the price they quoted me for small quantities of 2708's was $23... ARRRGH!).

You are quite welcome to have the MODEM7 program. I tried to transfer some files over the air, but it seems the Vancouver software is not sending a control-s to stop the input when the buffer gets full (I am not entirely sure of this, but will have to look at the listing to verify it). So in the meantime, I will just modem it across (late at night). There are some other programs here that may be of interest to other users: cross-assemblers for the 6502, 6800, Z80 and 8085, as well as PASCAL that I hope to get online soon.

Sorry to rush off so quickly from the meeting the other day, but I had to go to work early that evening, and it was about time to check in when the meeting closed.

73, Brian

I asked Larry Kayser to give us a more complete description of the Ottawa-Vancouver satellite link, and here is his response:

TO: HM
FROM: LSK
SENT: 03 SEP 81 10:20:12
READ: 04 SEP 81 08:19:16

KA6M, Hank

This is a description of the satellite system we are trying to make work to Vancouver from Ottawa. I have drawn it out and will word-describe it to you.

At the Ottawa end we have a 222.34 MHz digital radio terminal running on 9600 BPS connected to the Terminal port on a VADCG micro board. The EPROM software on the VADCG board has been modified to interface to our terminal node software in EPROM in place of the VADCG terminal terminal software. The balance of the software in the VADCG board is standard - at least as Vancouver sees standardization. The output of the VADCG board is connected to an old WECo 202D type modem which is in turn connected to the Satellite earth station audio equipment via a 4 wire connection. The satellite station runs via our domestic satellite ANIK in the 12/14 GHz band and is an FM sub carrier on a video channel. The video is two way and part of the Knowledge Network experimental program here in Canada. At the far end another 202D is connected to the satellite earth station and then a short cable at RS232 is connected to yet another 202D modem. This second modem is connected to a 146 MHz radio and uses one of the RS232 signal leads to key the radio on and off. The site is easily accessible in Vancouver however in Ottawa the site is not repeat not accessable without prior arrangements and then only in the daytime when we are all at work.

At this time we can get packets to them part to most of the time. They are not able to get packets to us at all. The problems probably stack up something like this:

1. The timing characteristics of the 202D units are not well understood from a system perspective and in fact the "back to back" units are a real mish mash and Vancouver is working to put two VADCG boards "back to back" and try and cure the problem that way. This is fraught with a lot of problems and I am trying to put some other members of the brotherhood who are in the transmission business on it so we can measure it all and make it work because we understand it rather than our current method.

2. In addition we have no idea what the proper TLP's for the earth station connect points are as well we have no info on the specs for delay distortion and impulse performance. If the hunt and peck methond doesn't work we will have to go back in and have a go at it.

Listening in to the system via the satellite down link is probably not possible as the foot print on the earth is much more controlled from the results we get on 4/6 GHz. I have easilly looked at ANIK on 4/6 in South Carolina but I suspect that the 12/14 is much further down - like about 15 to 20 db or more. It is not likely that you would be successful in pulling such a thing off. I am also not aware of the band plan or the sub carrier plan for the system so it might be a bit much.

Our intent for this is to show that it can be done and desperately try to put some non amateurs on our Ottawa Computer Group Community Bulletin Board through to a similar type of person in Vancouver. This is what the ultimate aim is and we still have a chance to pull this one off. After that it would

be interestins to see what we could do with it and how we could set people to use the thins. In the series sence it is a lot of stuff to set runnins all at once and frankly if we didnt't have our messase resource between us the prosress would be frankly one tenth of speed.

So for now that's about it. I can answer any questions the sroup misht have and try and be more specific on points if anyone is interested.

de Larry VE3QB

Date: 3 Sep 81; 23:32
To: Hank Masnuski, ka6m
From: Cal Teague, k6hwj
Subject: Bug in KA6M** code
Msg:

I think I found (and triggered) a bug in the computer code which kills the computer link. I tried typing a couple of files, and wanted to abort the printout with ^C^A. I noticed that almost a complete screenful went by after the ^C^A, so the next time I tried ^O^C^A, thinking that maybe the DG buffer was probably rather large and full. That apparently did it: DG, in their infinite wisdom (?), requires a ^Q after a ^O to restart the output (I think). But I don't think the ^Q will ever make it all the way through the system to the DG port. Hence, the computer port seems to be completely dead, although PED doesn't indicate a hung process from the phone line port. That is an example of why I don't think there should be some characters which simply can't make it through the VADCG TIP program to the LIP. Since the VADCG buffers probably were never full, the Vancouver board never sent the DG a ^S, so it apparently won't let me send the ^Q through to the DG; it simply traps it, looks at its own internal buffers, and sets its local flag saying to continue local output. If I could get the ^Q through, I think I could unhang the port, but no combination of ^Q, ^C^B, ^D^D, etc. seems to make it through.

The reason I suspect the ^Q problem is that we recently put a 300 baud modem on our DG at work, but the person who installed it didn't connect the full set of wires -- only the data lines. Hence, the modem doesn't turn off the tone and disconnect from the phone line when the user logs off; it listens to the noise caused by the user taking his phone out of the acoustic coupler and putting it on hook. One time, this process apparently sent in a ^S as a garbage character. Even though no one was logged on at that time, the port was completely dead until a ^Q came in from the modem!!! The DG turkeys don't reset the flow control flags when the user is not logged in !!!
It took me an hour to find that one last week.

DATE: SEPT. 3,1981
TO: HANK, KA6M
FROM: BRIAN, KD6LI

HANK --

Your check will be in the mail tonight. I looked at the spec sheet for the MK4118 and it doesn't look like it will be too difficult to modify the board to accept them. I will probably just use header extensions rather than cut traces on the board.

You must have a good parts source. I checked with Elmar today about the price of some parts today, and their prices were quite high for most things (for example the price they quoted me for small quantities of 2708's was $23... ARRRGH!).

You are quite welcome to have the MODEM7 program. I tried to transfer some files over the air, but it seems the Vancouver software is not sending a control-s to stop the input when the buffer gets full (I am not entirely sure of this, but will have to look at the listing to verify it). So in the meantime, I will just modem it across (late at night). There are some other programs here that may be of interest to other users: cross-assemblers for the 6502, 6800, Z80 and 8085, as well as PASCAL that I hope to get online soon.

Sorry to rush off so quickly from the meeting the other day, but I had to go to work early that evening, and it was about time to check in when the meeting closed.

73, Brian

TO: HM
FROM: PRNET DML
SENT: 17 AUG 81 20:42:09
READ: 31 AUG 81 10:10:04

Hank,

An order for 100 new boards was placed with the PC board manufacturer a couple of weeks ago. I have been assured by the manufacturer that the boards will be ready before September 11. I will be making arrangements with him to drop ship the boards you need directly from the manufacturer. Please advise me how many you want shipped to you and I will make arrangements. The boards are being made in the U.S. this time and so there should be no delays in getting them to yo after that. I apologize for the slow delivery but I assure you it won't happen again. The strike here slowed down communications and Don Oliver had to make a special trip down to the states to deliver the artwork and instructions. Please apologize for us to those who are patiently waiting for their board. There is a chance the boards will be ready a week before September 11 and that date is the very latest the boards will be ready.

73, Doug

141 MAPLE LANE
LANCASTER, PA 17601
31 AUGUST 1981

31 BB AUG

PAUL RINALDO, W4RI
1524 SPRINGVALE AVE.
MCLEAN, VA 22101

DEAR PAUL,

I HAVE BEEN THINKING FURTHER ABOUT MY SUGGESTION RELATIVE USING DEAD TIME ON ATS-6 FOR PACKET EXPERIMENTS. I HAVE SEEN THE NASA DEMONSTRATION SET UP AND IT IS VERY SIMPLE AND VERY PORTABLE. WHAT DO YOU THINK ABOUT TRYING TO SET UP A DEMO FOR THE OCTOBER 16 CONFERENCE. NASA WOULD PROBABLY LIKE THE CHANCE FOR THE PUBLICITY AND WOULD LOAN THE USE OF THEIR PORTABLE RF GEAR.

WHAT I HAD IN MIND WAS A SATELLITE LINK BETWEEN THE CONFERENCE, KA6M, AND VANCOUVER. IT APPEARS THAT KA6M AND THE VANCOUVER GROUP ARE SUFFICIENTLY ORGANIZED TO PULL THIS OFF AS THEY ARE ALREADY ON THE AIR WITH A LARGE GROUP OF USERS, 30 FOR KA6M AND I SUPPOSE A SIMILAR NUMBER IN VANCOUVER ALTHOUGH I DON'T RECALL SEEING ANY NUMBERS. I GATHER THERE ARE AT LEAST A COUPLE OF WORKING TERMINALS IN THE VIRGINIA GROUP WHICH COULD BE SET UP AT NBS.

I THINK SUCH A SET UP WOULD PRODUCE SOME VERY GOOD PUBLICITY AND I WILL TALK TO A FRIEND WHO WORKS PART TIME FOR NBC IF THERE IS A DECISION TO GO AHEAD WITH SUCH A DEMONSTRATION. DON'T KNOW IF ANYTHING WOULD COME OF IT BUT IT'S WORTH A TRY. THERE'S ALSO THE GROUP IN CALIFORNIA WHO HAVE DONE THE ARRY PROMO FILMS.

73,

GEORGE GADBOIS, W3FEY

Replied
9-14-81

1046 SW 61 Av
Margate FL 33068
21 August 1981
WB4LVA

Dear Hank,

I read with interest your letter on packet radio. I am considering establishing one in the north side of Fort Lauderdale which might cover an area from Miami to West Palm Beach. I have the radio and modem already, and hope that someone will convert the VADCG TNC to packet repeater operation.

Enclosed is a case and an extra stamp to defray the ~~cost~~ postage incurred by you for such a large amount of information you sent me. Also please find some information I received from a member of the Akron Digitab Group on the Electronic Systems modem board which uses the XR-2211. The data sheet of the 2211 (pg 5) details the components for 1200 baud (202 type) operation.

What I would like to know is the operating frequencies of the packet repeaters in

WASH DC
L.A.
El Paso
Denver
Sacramento
Hamilton

Can this system operate on Hi band as well as UHF, both physically and legally?

Do you plan to add dist storage to the repeater?

What frequencies on 20 Meters are you using?

When will the software and schematics for repeater be available, and how much?

OVER

Reference VADCG!

Why do you recomend buying a pair of TNCs?

Where is the software for the TNC available?

Has anyone programed the TNC as a packet repeater and, if so, is that software available?

My own home computer is a Radio Shack TRS-80 Color computer with 16K of memory. Im waiting for the Disk System which should be along shortly. No HF rig as yet but Im looking for a Drake R4B-T4XB combo or similar. Thanks for the information, thanks for listening. Hope to hear from you soon.

Ernie Johnston WB4LUA

P.S. When are you going to write an article for QST or HR?

HUGH W. MORGAN, W4VAB
7725 Berkshire Blvd.
Powell, TN. 37849
(615) 947-6439

August 20, 1981

Mr. H. S. Magnuski, KA6M
311 Stanford Ave
Menlo Park, CA 94025

Dear Mr. Magnuski,

Your article entitled "A Packet Network Simulator" which appeared in the November/December 1980 issue of Orbit has captured my interest. I have attempted to run the program in the North Star version of UCSD Pascal, but am encountering difficulty.

The problems relate to the random function, and perhaps to 'procedure update'. The program runs but it is apparent from the summary at the end that all stations are switching on and off at the same time. Also, the summary of activity prints all zeros for numbers of packets, collisions and bytes sent. It occassionally indicates that delays have occurred. Channel efficiency is always reported at 00.00% and the channel duty cycle is reported as approximately 50%.

I would like to get this program running because it would be an excellent demonstration program for use at the ham club and the computer club because it shows the relationship of the two hobbies. It also shows the style and power of Pascal.

Enclosed is a listing of the program as entered. The red marks indicate errors already found and corrected. Also enclosed is a self addressed stamped envelope. Your comments and suggestions would be very much appreciated.

If you need any volunteer assistance with the AMICON effort please sign me up!

73's

Hugh

Hugh W. Morgan
W4VAB

9-14-81

Route 2, Box 233B
Sterling, Va. 22170
18 August 1981

Dr. Hank Magnuski
311 Stanford Ave.
Menlo Park, CA 94025

Dear Hank,

I apologize for taking so long to send you a check. I included the cost of the TNC board you sent Cliff which ended up in my rack as Cliff received his finally from Canada. I included money for (2) 8250 chips. We have trouble getting them quickly here. That may change soon I hope as we have a friend at Intel.

Attached is a copy of my letter of intent to Paul concerning the October conference. We (the whole group of us) are studying slotting schemes to eliminate the hidden transmitter problem and the paper will concern that. Our repeater is really a TNC board with different software for the TIP. Currently it does nothing neat but repeat if the FCS is good. Frequency is currently 147.585.

I have discovered two bugs. One, in the LIP I think, is that the board gets into a condition with RTS HIGH (transmitter on) and continuous transitions on the data line (garbage data forever). This condition can only be fixed by reset. The second thing I noticed is I was connected to Cliff (W4CQI) last night and Bill (W4MIB) came up and requested connection with me and got it! Is that in spec? I hope not. If I had been sending Cliff a file or he was accessing my Host computer, the transfer would have been broken up. Either of these bugs I may have introduced by poor configuration management of the software (getting the published fixes on wrong) so I am going to send you a disk to look at to see if I did it. Any help you can give in this area is appreciated.

Sincerely,

David W. Borden

Route 2, Box 233B
Sterling, Va. 22170
18 August 1981

Mr. Paul L. Rinaldo
1524 Springvale Avenue
McLean, Virginia 22101

Dear Paul,

This is to formally inform you of my intent to present a paper at the October meeting. This paper concerns local area networking and thus may be presented at that session if desired. The paper:

> Thruput Enhancement of a Local Area Single Frequency Packet Repeater
>
> This paper discusses the single frequency time diversity packet radio repeater as implemented by Hank Magnuski, KA6M and suggests follow on experiments to increase thruput and utility of the machine. These experiments are intended to be implemented on the AMRAD packet radio repeater, WB5MMB/R and reported on in QEX to encourage further work along this line.

The problem I have is that this paper contains ideas of Sandy (WB5MMB), Terry (WB4JFI) and Jon (WA3JSV). I need some method of giving them all proper credit. Any ideas you can provide along these lines will be greatly appreciated. I apologize for my late notice of intent.

Sincerely,

David W. Borden, K8MMO

Copy to:
WB5MMB
WB4JFI
WA3JSV
KA6M

Warrenton, Va.
Aug. 14, 1981

Dear Hank,

Thanks for your note which I received this morning. I'm sorry you havent received payment for the board. When I received it, I sent it on to Dave Borden, K8MMO, at his request, since I had coincidentally received the board from VADCG a day or two before. I enclosed a note, and told Dave to send you a check.

I'll remind Dave this evening to get a check off to you. I sometimes get the impression that Dave has a short memory, hi! Dave tells me he talks to you occasionally, so you might remind him also. Failing all else, I guess I will have to send you the check, and then try to collect from Dave.

I have my packet system running now. I built up a small modem using the Exar chips and it's working quite well now. I'm going to have to make a small change in the TIP to delete the terminal echo. This is a real pain when using a computer. It's OK for a dumb terminal, but no good if you want to run a more elaborate computer program. Also need the full RS-232 controls for proper operation.

73, Cliff

Cliff Pittelkau, W4CQI

141 MAPLE LANE
LANCASTER, PA 17601
15 AUGUST 1981

DEAR PAUL,

I HAVE BEEN FOLLOWING THE AMRAD PACKET RADIO WORK WITH GREAT INTEREST. A RECENT ISSUE OF HR REPORT NOTED SOME CANADIAN EXPERIMENTS WITH ANIK-B. THIS GOT ME TO THINKING OF THE NASA ATS-6 SATELLITE WHICH I SUSPECT IS IDLE MOST EVENINGS AND WEEKENDS. NASA IS HUNGRY FOR APPLICATIONS AND JUSTIFICATION FOR THEIR BUDGET SO IT IS QUITE POSSIBLE THAT THEY WOULD APPROVE AMATEUR PACKET EXPERIMENTS DURING IDLE HOURS. ONE BIG ADVANTAGE IS THAT ATS-6 USES GOVERNMENT FREQUENCIES SO THAT FCC RULES ON BAUD RATES AND CW ID WOULD NOT APPLY. UNLESS SOMEONE WERE FOOLISH ENOUGH TO BRING UP THE SUBJECT IT IS UNLIKELY THAT NASA WOULD THINK OF SUCH NONSENSE.

IF THERE IS SUFFICIENT INTEREST TO SUPPORT IT I THINK AMRAD SHOULD MAKE A PROPOSAL TO NASA FOR PACKET EXPERIMENTS ON ATS-6. NASA HAS SOME DEMO EQUIPMENT THAT THEY WOULD GIVE OUT THE CIRCUIT INFO FOR AND MAYBE EVEN A SHORT TERM LOAN TO GET STARTED.

I HAVE SEEN THEIR DEMONSTRATION WHICH CAN BE OBTAINED FOR ANY EVENT WHERE A GOOD CROWD IS LIKELY AS FOR EXAMPLE THE ARRL COMPUTER COMMUNICATIONS SYMPOSIUM IN OCTOBER.

I AM ENCLOSING A COPY OF THE PRELIMINARY MANUAL FOR THE RCA VP3301 DATA TERMINAL. THIS MAY BE OF INTEREST TO SOME OF THE AMRAD MEMBERS. I HAVE BEEN ABLE TO BORROW A TERMINAL A COUPLE OF TIMES AND HAVE INTERFACED IT TO MY VIP COMPUTER FOR TESTS. I HAVE NOT TRIED IT ON THE AIR YET BUT HOPE TO IN THE FALL WHEN I GET SOME TIME TO GET A MODEM GOING. THIS TERMINAL HAS SO MANY FEATURES IT IS HARD TO KNOW WHAT TO DO WITH THEM ALL. WITH THE TREMENDOUS SPEED FLEXIBILITY IT SHOULD BE APPLICABLE TO MANY HOME COMPUTER USES. I HAVE SEEN PARTS OF THE RCA SHOW DEMO FOR THE TERMINAL AND IT QUITE INTERESTING. AMONG MANY PRACTICAL THINGS THEY PUT IN A LOT OF PIZZAZ. FOR INSTANCE, THEY DRAW AND AMERICAN FLAG ON THE SCREEN AND THEN PLAY THE FIRST FEW BARS OF "THE STAR SPANGLED BANNER".

GOOD SUBSTITUTE FOR NOISY TELETYPE MACHINES!

JUST WANT TO COMMENT ON THE GOOD WORK YOU ARE DOING ON THE AMRAD NEWSLETTER. IF I HAVE ANYTHING THAT I THINK WOULD INTEREST THE GENERAL MEMBERSHIP I'LL WRITE IT UP FOR YOU. I AM STILL IMPROVING MY RTTY SYSTEM WITH THE VIP COMPUTER. I NOW HAVE 32K OF RAM AND THAT SEEMS TO BE ENOUGH. PROGRESS HAS BEEN SLOW OVER THE SUMMER BUT I EXPECT TO GET MOVING AGAIN IN THE FALL. I AM NOW WORKING ON PUTTING TOGETHER A NEW COMPUTER ALONG THE LINES OF THE NEW $499 COSMAC DEVELOPMENT SYSTEM.

73,

GEORGE S. GADBOIS, W3FEY

two user groups. I hope we will be able to include AMRAD in this setup shortly.

311 Stanford Avenue
Menlo Park, CA 94025
August 8th, 1981

Mr. Paul L. Rinaldo
1524 Springvale Avenue
McLean, Virginia 22101

Dear Paul,

Thanks very much for the several mailings which you sent. The material is interesting and informative, and I appreciate your efforts. The main purpose of this letter is to inform you of my intent to come to the October meeting and to contribute one paper to the session:

> On the Care and Feeding of your Packet Repeater
>
> This paper will describe the construction and operation of the KA6M packet repeater, and will report on the operational results during the first 10 months of service. Since its initial turn-on in December of 1980, the repeater has been transformed from an experiment to a major Bay Area repeater serving a user group now approaching 30 stations. The repeater has been extremely important in testing new hardware and software, and in provoking interest in the area's amateur community.

In addition to the above presentation, I feel we should have a session on the design of the AMICON satellite network. I don't know that I can get a revised draft of the spec done by the meeting date, but we could at least get together a panel to discuss some of the issues. Perhaps you can schedule something of the sort, particularly since this meeting will be so close to AMSAT's.

There are a few other pieces of good news. Howard Nurse, W6LLO, has completed his VADCG installation, and is going to dedicate the hardware to a 20M gateway. We are now ready for some scheds. When the equipment is not otherwise being used, it will be connected to our mailbox system here, which is on-line 24 hours a day.

I talked to Jon Postel, editor of the INTERNET spec, and he was very interested to hear of our possible application of the spec to packet radio. He has now assigned the Amateur Packet Radio Network and official INTERNET network number which is 44 (decimal), conveniently exactly half of that famous number, 88. We also discussed some of the issues of addressing and routing, and he was very helpful. I also now have the IP, TCP and ARPAMAIL documents in machine readable form, for possible distribution over our PR nets.

We have established a network link from SFO to Vancouver and Ottawa via a link on a commercial packet network where we now have a courtesy account. Messages from our users here are being routinely dispatched to the above two user groups. I hope we will be able to include AMRAD in this setup shortly.

Dear [illegible]

Thanks very much for the several notices with your paper. The material is very useful and informative, and I appreciate your efforts. The only purpose of these letters is to inform you or my intent to come to the October meeting and I do not expect to need to hear from you.

As the time gets closer to your initial deployment [illegible]

[illegible] paper will describe the construction and operation of the [illegible] model receiver, and will report on the operational capability thereof. The [illegible] of various of services, since its initial [illegible] in December of 1980, has prepared nos been transformed [illegible] an operation to a major Pan Arab corporate service that [illegible] group now [illegible] 20 of items. The response has been extremely important in creating new interest in our software, and in providing [illegible] in the area's economy [illegible].

[illegible] to the above presentation. I feel we could have a session on [illegible] of the Mideast satellite network. I don't know what I can get [illegible] report of the work done by the meeting date, but we could at least get together a panel to discuss some of the issues. Perhaps you can schedule something at the end, since only a few [illegible] meeting will be to come to [illegible].

[illegible] piece of good news. Tommy Moore, [illegible], has completed [illegible] and is going to California [illegible] to a Los [illegible] to be ready for some schools. Then the equipment is [illegible] [illegible] to be connected to our production system here, which is [illegible] [illegible].

[illegible] edition of the [illegible] says it was very important [illegible] one [illegible] application of the spec to pocket radios. We have now [illegible] the Compact Pocket Radio Network and official [illegible] network [illegible] which is 64 (decimal), consistently half of that famous [illegible], 128. In addition to the issues of addressing and routing, and be [illegible] we [illegible] have the [illegible] CB and AUXAMAT documents in [illegible] [illegible] the possible distribution over our [illegible].

[illegible] a personal link from SFO to Vancouver for [illegible] with [illegible] commercial packet network where we now have a [illegible] account. [illegible] [illegible] are being routed [illegible] to the [illegible] [illegible] [illegible] I [illegible] [illegible] to [illegible]. Also [illegible] [illegible] [illegible].

Enclosed are some items which you may feel are worthwhile distributing or publishing in the AMRAD bulletin.

Best regards,

Hank Magnuski, KA6M

The following piece of mail was intercepted from the SFO to Ottawa packet mail link. It concerns some work done which may be of general interest.

VE3QB DE WA6RZW ED IN MENLO PARK, CA.

THE PROGRAM I AM NOW RUNNING ON THE H-8 IS NOT DISK BASED. I HAD TRIED TO RUN THE PROGRAM UNDER HDOS BUT RAN INTO ALL KINDS OF PROBLEMS IN THE CONVERSION OF THE VADCG SOFTWARE FROM 8085 (CP/M) EDITED VERSION TO THE 8080 (HEATH ASSEMBLER VERSION). HOWEVER I DO BELIEVE THE PROGRAM WILL NOW RUN UNDER HDOS. IN THE FUTURE I WOULD LIKELY REWRITE IT FOR HDOS. IF YOU ARE INTERESTED YOU ARE WELCOME TO THE FRUITS OF MY LABOR. I'M JUST GLAD SOMEONE ELSE IS INTERERESTED IN A SIMILAR PROJECT. LET'S SEE, YOU HAD ANOTHER QUESTION OR TWO. LET ME TELL YOU A LITTLE ABOUT THE HARDWARE. IT USES THE INTEL 8273. IT'S MOUNTED ON A SMALL PERF BOARD ATTACHED TO A H8-2 (PARALLEL BOARD). THE 8273 IS TIED TO THE BUSS VIA A 24 LEAD RIBBON CABLE PLUGGED INTO A VACATED 8251 SOCKET. ADDRESS DECODING IS HANDLED BY THE STANDARD HEATH CIRCUIT ON THE H8-2, (A FEW LEADS ARE REQUIRED TO RUN ON THE BOARD, AND SOME FOILS CUT). THE CLOCK FOR THE 8273 IS TAPPED OFF THE DIVIDER ON THE H8-5. YOU COULD ALSO USE A CLOCK FROM AN H8-4 PORT. THE ASYNC SERIAL I/O FOR THE PACKET PROGRAM IS CONVERTED TO 8251. KEYBOARD (RECEIVE) INTERRUPTS ARE USED, HOWEVER TRANSMIT IS RUNNING IN A POLLED ENVIRONMENT.

YOU CAN PULL THE SOURCE FROM MY SYSTEM MOST ANYTIME OF DAY. ABOUT THE ONLY TIME I USE THE SYSTEM IS BETWEEN 1900-2300 PDT. ALL THE REST OF THE TIME THE SYSTEM IS ON THE PHONE. IT'S SET (HARDWARE) FOR 1200 BAUD. RUNNING A 212A DATASET. IF YOU NEED IT AT 300 BAUD LET ME KNOW AND I CAN LEAVE IT AT 300. IT'S ON A ROTARY SWITCH SO IT'S EASY TO CHANGE. MY NUMBER IS 415-326-3662 (VOICE).

THANKS FOR YOUR INTEREST.

VE3QB DE ED WA6RZW IN MENLO PARK, CA.
28 JULY 81 2125 PDT
NNNN

VE3QB DE WA6RZW ED IN MENLO PARK, CA.
THE PROGRAM I AM NOW RUNNING ON THE H-8 IS NOT DISK BASED. I HAD ORIGINALLY TRIED TO RUN THE PROGRAM UNDER HDOS BUT RAN INTO ALL KINDS OF PROBLEMS IN THE CONVERSION OF THE VADCG SOFTWARE FROM 8080 (CP/M) EDITED VERSION TO THE 8080 (HEATH ASSEMBLER VERSION). HOWEVER I DO BELIEVE THE PROGRAM WILL NOW RUN UNDER HDOS. IN THE FUTURE I WOULD LIKELY REWRITE IT FOR HDOS. IF YOU ARE INTERESTED YOU ARE WELCOME TO THE FRUITS OF MY LABOR. I'M JUST GLAD SOMEONE ELSE IS INTERERESTED IN A SIMILAR PROJECT. LET'S SEE, YOU HAD ANOTHER QUESTION OR TWO. LET ME TELL YOU A LITTLE ABOUT THE HARDWARE. IT USES THE INTEL 8273. IT'S MOUNTED ON A SMALL PERF BOARD ATTACHED TO A HB-2 (PARALLEL BOARD). THE 8273 IS TIED TO THE BUSS VIA A 24 LEAD RIBBON CABLE PLUGGED INTO A VACATED 8251 SOCKET. ADDRESS DECODING IS HANDLED BY THE STANDARD HEATH CIRCUIT ON THE HB-2, (A FEW LEADS ARE REQUIRED TO RUN ON THE BOARD, AND SOME FOILS CUT). THE CLOCK FOR THE 8273 IS TAPPED OFF THE DIVIDER ON THE HB-5. YOU COULD ALSO USE A CLOCK FROM AN HB-4 PORT. THE ASYNC SERIAL I/O FOR THE PACKET PROGRAM IS CONVERTED TO 8251. KEYBOARD (RECEIVE) INTERRUPTS ARE USED. HOWEVER TRANSMIT IS RUNNING IN A POLLED ENVIRONMENT.
YOU CAN PULL THE SOURCE FROM MY SYSTEM MOST ANYTIME OF DAY ABOUT THE ONLY TIME I USE THE SYSTEM IS BETWEEN 1900-2300 PDT. ALL THE REST OF THE TIME THE SYSTEM IS ON THE PHONE. IT'S SET (HARDWARE) FOR 1200 BAUD, RUNNING A 212A DATASET. IF YOU NEED IT AT 300 BAUD LET ME KNOW AND I CAN LEAVE IT AT 300. IT'S ON A ROTARY SWITCH SO IT'S EASY TO CHANGE (PERIOD) THE NUMBER IS 415 327-7278 (COMPUTER) 415 326-3662 (VOICE).

HOPE THEY GET YOUR MAIL GOING. OR MAYBE IT'S BETTER THIS WAY, NO BILLS AND JUNK MAIL. THANKS FOR YOUR INTEREST.

VE3QB DE ED WA6RZW IN MENLO PARK, CA.
28 JULY 81 2125 PDT
NNNN

1054

1854 Maryland Ave.
Schenectady, N.Y. 12308
July 31, 1981

Mr. H. Magnuski, KA6M
311 Stanford Avenue
Menlo Park, CA 94025

Dear Hank,

As a result of our phone conversation of June 25, 1981, I am enclosing a check for $40.00 to cover the cost of a 8273 protocol chip and a copy of the CPM disk containing the packet radio software. Could you also include a sample of the terminal programs as well as the network or line interface programs. If the amount is not correct please let me know so that I can send you the difference. My notes were not clear.

I have located a place where I can get the CPM disk listed with no problem. I also (on Intel systems) can get the 2708's burned.

Since I last talked with you I have constructed the Vancouver board and ordered the IC's that I didn't have. I am now trying to put together a Video terminal to use with the Vancouver board.

I'm looking forward to getting this project running. I saw a modem article in "Packet Radio" by VE2PY,(Robert Roubeau and VE2BEN, Ian Hodgson). It looks interesting due to the EXAR 2206, 2211 chips. Is that what is in the making with the Vancouver group?

73's

Sincerely yours,

William M. Patmos

William M. Patmos
W2DHT

Enc.
Work phone: (518) 385-7247
Home Phone: (518) 346-1382

+ LIST W 6

300 BAUD

The Computer Advisory inc.
2300 County Center Drive / Suite 200 / Santa Rosa, California 95401 / (707) 544-9500

July 10, 1981

Hank Magnuski, KA6M
311 Stanford Ave.
Menlo Park, Ca. 94025

Dear Sir;

I would be interested in more information regardind the PACKET RADIO CONTROLLER, the people using it, and newsletters.

Thank You,

Mike Greenhalgh
The Computer Advisory, Inc.

sent 8/12/81

CSI COMMUNICATIONS SYSTEMS INCORPORATED
1165 Harrison Street
Seattle, Washington 98109
(206) 622-7479

8/12.

July 7, 1981

Our Ref: FW-204/81

Hank Magnuski, KA6M
311 Stanford Avenue
Menlo Park, CA 94025

Dear Hank,

I read with great interest your article on the KA6M/R Packet Repeater System. I would be interested in knowing what type of radio equipment you used and the interface of the transmitter modulation ckts and at what point you recover the received audio.

I am familiar with most types of commercial FM VHF equipment available today so perhaps just a brief explanation would be appreciated. I will gladly pay any copying costs if you have additional hard copy data available. My primary interest is using the concept for both voice and computer re-transmission. I would guess that a direct FM transmitter would be desirable due to more faithful low frequency reproduction.

I am looking forward to hearing from you. Thank you for your time.

Sincerely,

Fred Williams

Fred Williams KD7U

FW/bp

2456 Groveland Cir. S.
Macon, Ga. 31206
June 30, 1981

Hank Magnuski, KA6M
311 Stanford Ave.
Menlo Park, Ca. 94025

Dear Hank,

I've read your article on packet radio in the July issue of Worldradio and would like to get some more information about your digital repeater. Many of the amateurs in the middle Georgia area here are also computer hobbyists - I think a packet repeater would be received quite well by all and used frequently.

Specifically, where can I find information on the Bell 202 modem, HDLC specs/standards, and system protocol? Also, any available schematics, block diagrams, Z-80 software source/object listings, etc. would be quite helpful in setting up a system here.

Any information that you can provide will be greatly appreciated.

Sincerely,

David

David Fentem, KW4M

8/12

CQ SSTV DE K4TWJ
DAVE INGRAM

Contributing Editor
Amateur Television Magazine

Eastwood Village No. 1201 So
Rt. 11 Box 499
Birmingham, AL 35210

June 29, 1981

Mr. Paul Rinaldo, W4RI
President, AMRAD
1524 Springvale Avenue
McLean, VA 22101

Dear Mr. Rinaldo,

We were both pleased and enthused to see the call for papers on packeting and networking which appeared on page 32, July QST. I have been developing a complete system directly along these lines, projecting to reveal the finished product during the near future. I've also been planning to contact AMRAD concerning this; the call for papers happened approximately two weeks before I would have thus contacted you. Shall we work together?

I would be most interested in presenting my concept, particularly since network complexity would require a multi-page synopsis and my present "typing time" is presently dedicated to completing a book with a pending deadline.

The general block diagrams of my system are enclosed. Since I'm writing an article on these, please keep them semi-confidential, at least until we discuss matters further. The National Microwave network will link areas/cities. Three digit encoding/enabling/disabling/destination specification/function are employed. Repetition of digits primary/secondary double capabilities without accidental accessing. Full duplex is employed. Microwave link is independent of local repeaters, but can be interfaced at any time desired - and in various ways according to needs/finances. A 'spur' for side areas joining link is shown on additional figure. Another block diagram, satellite interlinking for microwave network, illustrates how OSCAR Phase IV can be interconnected to provide true global communications. Note overall system compatability with 1990's communications. RSVP!

73,

Dave Ingram

Dave Ingram, K4TWJ

Enclosures

Telephone: 205/956-1785 Home-Nites

DAVE INGRAM, K4TWJ - OVERVIEW

- Avid Radio Amateur for over 20 years, hold 1st Phone Commercial License, radar endorsed and Amateur EXTRA Class License.

- Broadcast engineer, electronics instructor, lecturer on a national basis, inventor and electronics designer. Over 250 published articles to date. Articles have appeared in CQ, QST, 73, Ham Radio, Worldradio, A5, CQ Elettronica (Italy), Amateurski Radio (Russia), and several other magazines (worldwide).

- Author of 5 books:
  Complete Handbook of SSTV
  OSCAR The Ham Radio Satellites
  10 FM For The Radio Amateur
  Secrets of Ham Radio DXing
  44 Special Ham Radio Circuits

  and;

  Co-author of Editor and Engineers Radio Handbook (honorary privilege - past co-authors include Halligan, Lamb, Orr, Godsey, Gonsett, etc.)

- Previous monthly columns in 73, Worldradio, A5, and presently, CQ.

- Known worldwide as leader in video communications, with direct ties to video societies on four continents. Was one of the first SSTVers, but also active in DX, OSCAR, 10 FM, EME, QRP, MSTV, FSTV, computers, 2 Meters FM and SSB, gear design, etc.

- Direct connections with numerous equipment manufacturers, clubs and magazines. (A small A.R.R.L.!)

- Technical Advisor to A.R.R.L.

- Sponsor/creator International Slow Scan Society and Worldwide SSTV Contest

- Assisted University of Surrey (England) on design of upcoming UOSAT satellite with SSTV capabilities.

- Initiated and directed efforts which resulted in first time tv for Pitcairn Island, Norfolk Island, Pakistan and India. These efforts continue as assistance to "third world" areas.

micro adressing: 3 digit EN/DIS.
3 digit DESTINATION
3 digit LOCAL lockout
3 digit mailbox
2 digit FUNCTION(S)

Composite link modes:
Audio (FM), Spread Spect
ASCII, Digitalized (SSTV) VI
PACKET radio

SECONDARY LINKS

Note: All SECONDARY LINKS have 34/94 / 94/34 lockouts

PRIMARY/EMERGENCY LINKS

10 GHz

10 GHz

Code:
ENABLE DISABLE
123 / 124

EXAMPLE

R .16/T .76

.16/.76 Rptr

E. Code: D.
127/128

.76/.16

SCANNING XCVR

INPUT OUT CONTROL

MICRO PROCESSOR

MAILBOX

10 GHz

.94/.34 R T

2M XCVR

.34/.94 R T

RPTR

MICROS RESPONSES:
PROTOCOLS, HANDSHAKES
ON-AIR TONE CONFIRM'S
OF FUNCTIONS

EXAMPLE

.16/.76 RPTR

E. Code: D.
125/126

.76/.16

SCANNING XCVR

IN OUT CONTROL

MICRO PROCESSOR

MAILBOX

10 GHz

10 GHz

Code:
E. D.
121/122

.94/.34

2M XCVR

.34/.94 R T

RPTR

EXAMPLE

.13/.73 RPTR

MICRO PROCESSOR

MAILBOX

Code:
E 121/122 D

.73/.13 R T

SCANNING XCVR

IN OUT CONTROL

MICRO PROCESSOR

MAILBOX

10 GHz

10 GHz

Code:
E D
125/126

R .94/.34 T

2M XCVR

.34/.94 R T

RPTR

EXAMPLE

.52/.52

2M XCVR

MICRO PROCESSOR

Code:
E 123/124 D

.52/.52

SCANNING XCVR

IN OUT CONTRO

MICRO PROCESSOR

10 GHz

10 GHz

Code:
E 127/128 D

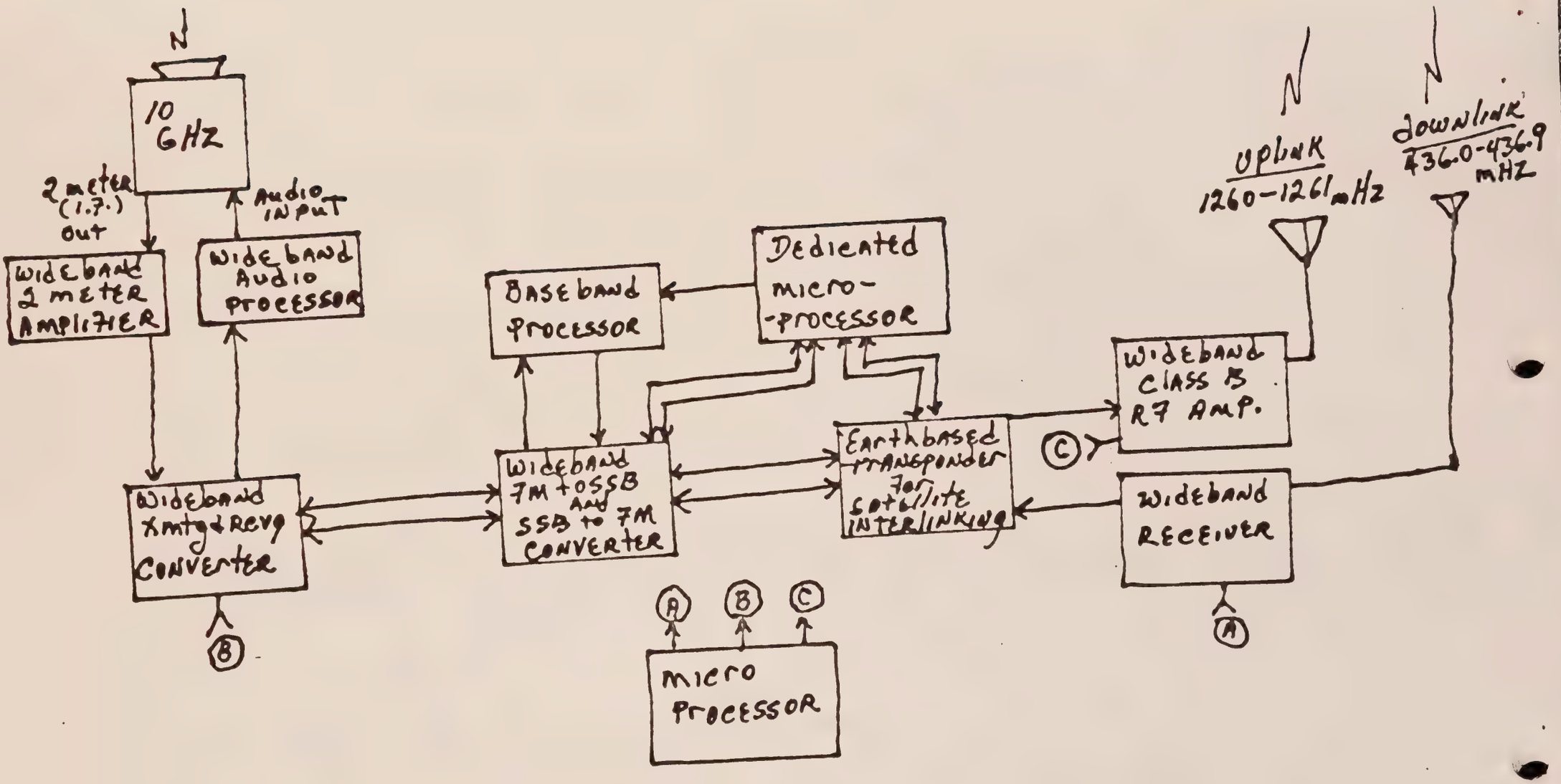
R .94/T .34

2M XCVR

.34/.94 R T

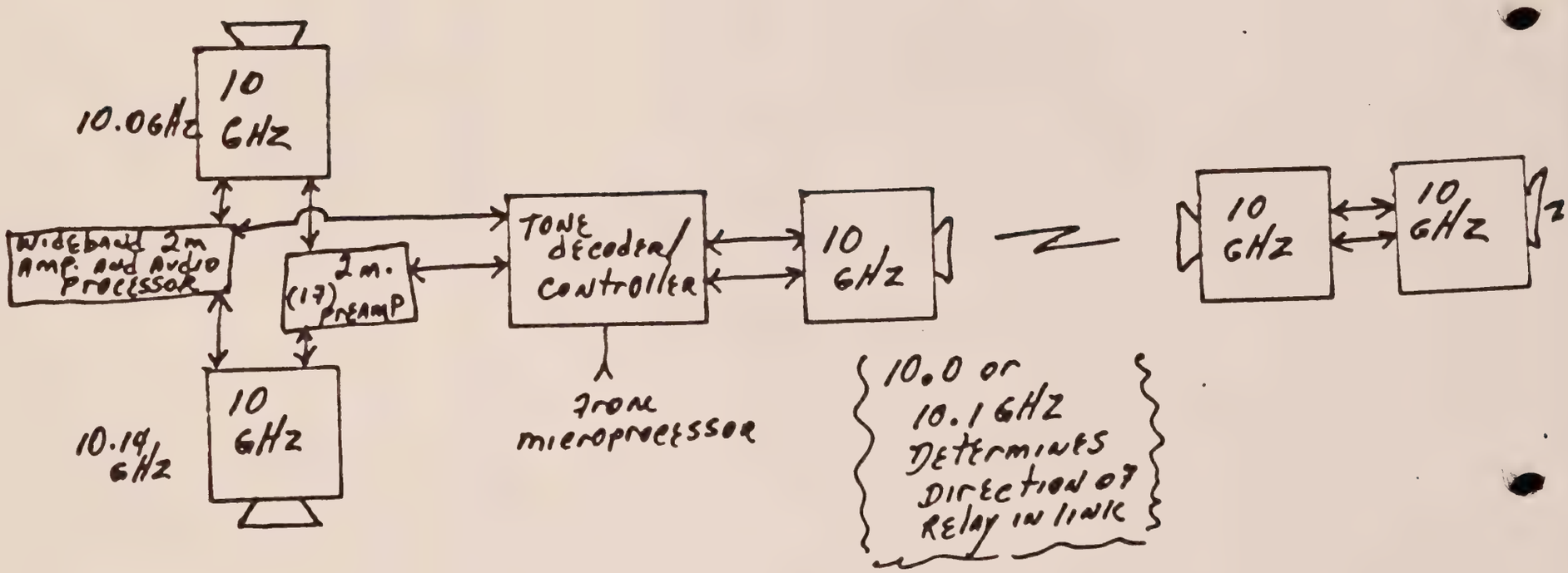
RPTR

NATIONAL MICROWAVE NETWO



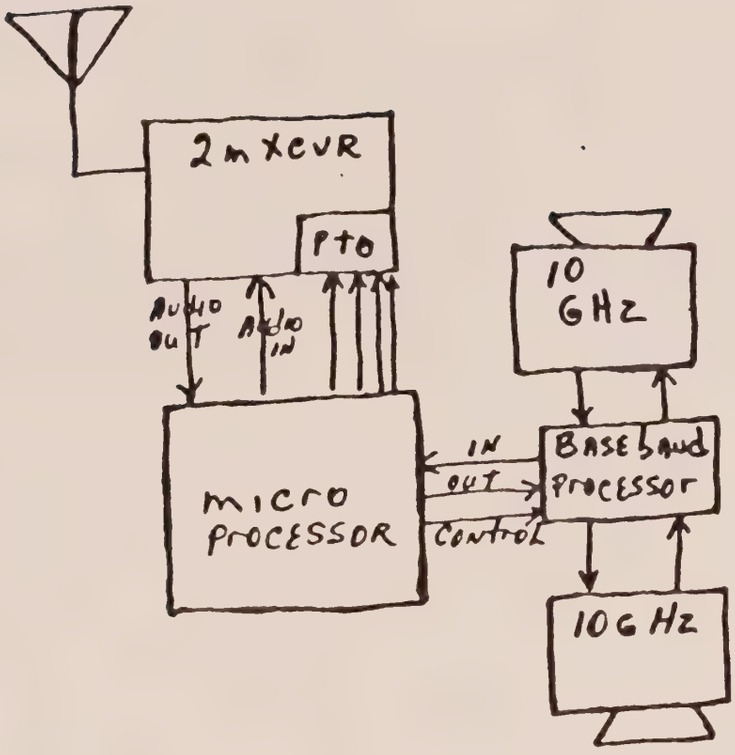
Satellite Interlink for Microwave Network

MASTER microprocessor monitors "control frequency" of 2 m. And Activity on 2 m. bandpass to enable satellite link if: A preestablished count of signals on 1) downlink 2) uplink 3) 2 m. bandpass aren't exceeded. If justified, then proper "followup sequence" of 2 m. "control signals" on specific frequency will ... satellite link.



'SPUR' which can be included in microwave network as desired

KHTWJ



INSIDE THE MICROWAVE NETWORK

microprocessor

monitors output of 2m XCVR and baseband processor for ENABLE/disable tones, ADRESSES of Data, ECT.

K4TWJ

310 Carlyn Drive
Milton, Florida 32570
28 June, 1981

Mr. Paul L. Rinaldo, W4RI
President, AMRAD
1524 Springvale Avenue
McLean, Virginia 22101

Dear Mr. Rinaldo:

For the past several months I have been working to promote the use of computers and the ASCII code in amateur radio traffic operations. Both the ARRL Communications Manager and Mr. Frank Butler, W4RH, the ARRL Southeastern Division Director, are aware of my interest in this area. Because of this Mr. Butler has provided me a copy of your call for papers dated May 22. I hope you won't mind my providing some comments on the subjects at hand.

First, it seems clear to me that great benefits can be gained if wisdom and foresight are applied early in this new game (new to amateur radio, that is). If provision is included for transmission of a full eight-bit byte we will have plenty of characters to dedicate to specific control functions. The present use of the non-printing ASCII characters from 00 to 7F hexadecimal seems to be a hodge-podge resulting from uncountable different hardware implementations. Properly defined, the new (80-FF hexadecimal) characters could actually specify standards to guide manufacturers of receivers, transmitters, transceivers and converters so that frequency and other parameters could be changed remotely by a net control station. In fact, it would be possible for the NCS alone to conduct an entire net session, pairing stations to clear traffic on separate frequencies as is now done but with the individual operator merely supervising his equipment to insure proper and legal operation as a VHF repeater control operator now does. Tomorrow's amateur station could be an integrated affair with HF, VHF/UHF and satellite capabilities, all with remote control provision, and as common as today's transceiver.

Secondly, we need some seasoned (but not dead intellectually!) present or previous TCC and perhaps area CW traffic handlers who are also combination computer hardware and programming types rolled into one. We need the CW experience because that is where the control function was (and is) best implemented. These same people need the computer knowledge so that they can apply their CW operating principles-with appropriate refinement and up-grading- to computer networking. In other words, we need integrated, or well rounded individuals to do the integrating of the system.

The next statement will probably be considered controversial. It is my conviction that we should bless the Baudot (or Murray) code with benign neglect. Presumably we're talking about making things as efficient as we can, and not just providing some means for chit-chatting, drawing pictures or otherwise

wasting the spectrum. In my efforts to date I have seldom found anyone who was willing to talk about changing to more efficient modes or modern equipment, if he was presently using old Baudot gear. The normal range of reasons seemed to include fear of change, fear of the unknown, lack of technical expertise, and expense of upgrading. In fact, some people with computers prefer to work Baudot! Many of these encounters were with NTS personnel. For this reason I have concluded that it is probably not practical to convert any NTS function except TCC and perhaps in a limited way the area nets. I am afraid these will have to evolve.

As to specific computer equipments--CPUs, busses, and so forth--we should merely define procedures, standards of performance, formats and control codes. With that much established the internal hardware and software of any particular station should appear transparent to the system itself.

There may be some concern about the reliability of ASCII vs Baudot transmission, especially on HF. For these past few months since W1AW started transmitting ASCII bulletins I have monitored the quality of both transmissions. The average results using ASCII are at least as good here (near Pensacola, Fl) as the Baudot. Note that the ASCII transmissions use 110 baud while Baudot uses 45.45. It is true that, at times, Baudot performs better than ASCII. It is also true that ASCII performs better at times than Baudot, and that the ASCII portion of superior transmission is greater than the Baudot, partly I suspect because of the Baudot shift problem. As an example, today is the 1981 field day operation so there is severe interference. I copied the ASCII bulletin better tonight (0100z) than the Baudot, and that on forty meters! There is another consideration--ASCII is a computer code in common use, Baudot is not.

In conclusion, the integration of computers into amateur radio holds exciting possibilities. It would be wonderful if all high-level NTS functions could be converted to it, but I am discouraged about those prospects. It is likely that that change will be one of evolution. Whatever is done will affect the design of future amateur equipment and operating practices--either by providing design guidance or by default. AMRAD and AMSAT have both achieved great goals in the past and enjoy outstanding reputations. I for one am very pleased to see you take the lead in this project.

It is unlikely that I can be in the Washington area in October. Therefore it is my hope that you will, if you find any of these comments worthy, take some action to have them considered. If they can be included as considerations in someone else's presentation that would be fine with me.

As an 'aside' comment--I have developed the necessary hardware and software to integrate a Z-80 based S-100 bus micro-computer into an amateur radio station. It transmits and receives both Baudot and ASCII and transmits CW (I prefer to do my own copying). The video presentation is similiar to the UCSD Pascal menu format if you are familiar with that, with separate buffer, transmit and receiving display areas. More details are available if it will aid in the effort.

Sincerely,

Nick Zorn N4SS

2551 Greenwich St #2
San Francisco, CA 94123
June 27, 1981

Hank Magnuski, KA6M
311 Stanford Avenue
Menlo Park, CA 94025

Dear Hank;

I am very interested in learning more about the KA6M/R packet repeater. I saw some of your literature at the Computer Faire in April. Unfortunately, there were no copies left by the time I got there. As I recall, you had arranged to make some Bell 202 compatible modems available at a very reasonable price. I wonder if there are still any left.

I am enclosing a SASE to facilitate your reply. Thanks.

73,

Frederick W. Bray
WB6ZRK

8/12

AMRAD

Amateur Radio Research and Development Corporation

1524 Springvale Avenue
McLean, Virginia 22101
1981 June 24

Dear Packeteers,

Here is another paquet of information collected from various sources:

An Hierarchical Addressing and Naming Convention for Amateur Radio Digital Communications by Doug Lockhart, VE7APU.

"MBX DE W6FFC TO K6AM AND PACKET RADIO $N" with info on whether a packet repeater is a repeater, quoting Johnny Johnston of the FCC.

Packet Users -- Northern California Area, a listing as of June 16, 1981.

Letter from Stu Beal to Paul Rinaldo dated June 12, 1981.

Letter from Frank Roberts to Stu Beal of June 4, 1981.

Letter from Bob Hajek, W9QBH, SEC, Illinois to Paul Rinaldo dated June 13, 1981.

Clipping from Electronic Engineering Times, June 22, 1981, "ANSI Wants ISO to Adopt NBS Computer Communication Protocol."

Dave Borden and I have written a tip-of-the-iceberg article on packets for QST, primarily as a backdrop to the October 16th conference. Dave Sumner and Doug DeMaw found room in the October issue, for which we are most grateful. If QST doesn't edit this part out, it contains a blatant commercial for the VADCG boards and for joining our clubs.

See the note on the back of the EE Times clipping. In addition to the NBS documents, W3OTC and Eric Scace, K3NA provided me with a copy of X.121 which includes a list of data country or geographical area codes (3 digits per country). I'm thinking of doing some brainstorming on this type of thing after digesting Doug's (above) paper. So, I'll hold it until a later time.

73,

Paul L. Rinaldo, W4RI

Distribution:

K8MMO	WB4JFI	W1UED	w/cys of encl
W3OTC	WB3KDU	KA6M	except to the
W4MIB	WB5MMB	VE7APU	sources.
W4CQI		VE3MWM	

EETIMES JUNE 22, 198,

ANSI Wants ISO To Adopt NBS Computer Communication Protocol

CHAMPAGNE, IL — ANSI is recommending that the "Transport" computer communications protocol, recently developed by the National Bureau of Standards (NBS) be made an international standard by the International Standards Organization (ISO). The same tactic will probably be used for "Session," the next higher protocol in the seven-level ISO model for computer networking.

The ANSI Committee in charge of the OSI (open systems interconnect) Reference Model of communications protocols has voted to recommend that the ISO adopt the recently published NBS proposed standard for the level-four (Transport) protocol. (See "NBS Proposes Computer Net Standards," April 27, p. 1.) An ANSI spokesman also indicates that the ISO is expected to soon approve standards for levels four, five and six, while an NBS spokesman adds that its recently published proposed standards for Transport and Session protocols (levels four and five) are directly compatible with the proposals now being worked on by the ISO.

The ANSI committee in charge of computer communications standards is X3T5. Within that, there are two subcommittees working on the Transport standard—X3T5.1, which has responsibility for the entire OSI reference model, and X3T5.6, which has specific responsiblity for layers four (the Transport standard) and five.

John Day, chairman of the ANSI X3T5.1 subcommittee and project manager here at Digital Technology, says he expects the Transport and Session protocols to be approved this year by WG6, the working group in charge of these protocols at the ISO. ANSI will, of course, have passed on those protocols before-hand. Day expects definitive action by the ISO on layer six by early 1982. Within ANSI, level-six projects are proceeding for virtual terminal, virtual file and job transfer manipulations.

Day reports that his subcommittee (X3T5.1), at its most recent meeting in May, recommended to the ISO that it adopt the recently published Transport protocol standard from the NBS. However, Day's group would only recommend the standard as a group

(See Adopt, Page 14)

The Transport Protocol

The Transport protocol is level four of the OSI Reference Model. That model was developed by the ISO as a framework within which to develop computer-communications standards. The Transport protocol is of particular interest and concern to many in the industry because it is functionally complex, and because it is the transition between the three lower-level communication protocols and the three computer-application protocols above it. Industry sources indicate that many companies have put a great deal of personnel resources into getting the Transport questions settled. Both the communications-oriented companies and the computer companies are vitally interested in this particular protocol problem.

The Transport protocol provides the end-to-end error and flow control functions that must be able to work over many kinds of networks. Also the efficient implementation of the transport protocol probably requires close connections into the operating systems of the host computers using the network. This is probably the only protocol that has an impact on the operating systems, according to NBS experts.

The Transport protocol must deal with high-speed local networks, public data networks and satellite links, all of which have very different bandwidth and propogation-delay characteristics. Even a simple computer-communication application may have hosts connected over complex combinations of differing networks. The first computer could be on a local network connected to a public data network, which in turn is connected to a second public network, and finally to the remote local network where the other computer resides. The Transport protocol must guarantee the integrity of the information transmitted between those two computers over that varied path.

At the lower protocol levels, the necessary error and data-flow integrity and control are not provided. Interface standards such as X.25, HDLC, Ethernet and data-link protocols now being developed by the IEEE 802 committee for local-area networks do not provide this end-to-end control capability. Transport solves the highest-level communications interfaces, then supports the applications-oriented operations above it where the communications problems must be transparent.

Adopt NBS Network Protocol, Says ANSI

(Continued from Page 12)

of "experts," and not formally, because of ANSI's procedural requirements.

ANSI rules require that the subcommittee in charge of a particular item formally approve the item before it gets official "approval." In this case, the subcommittee in charge of the proposed Transport standard (X3T5.6) had not yet met to vote. Thus, Day's committee could not attribute official ANSI approval to the proposal.

Day wanted the working group in the ISO (which will meet shortly in Berlin) to be as unencumbered as possible by having an official U.S. position on the Transport protocol. The working group would have been less hampered with an official position, but a semiofficial position is better than none for purposes of decision making.

Minor Modifications

The ISO also has its own current version of a Transport-protocol-layer standard which, according to Day, differs slightly from the current NBS standard. His committee has in its vote suggested changing both the NBS and ISO proposals to encompass one another. Day says, "The modifications are truly minor." An NBS source agrees, and indicates that NBS is willing to make the modifications.

Day also says that the executive board of the newly formed Network Users Association (NUA) has endorsed the "expert" position taken by his subcommittee. Day relates that he and other members of his committee have been concerned about getting the Transport standard approved soon, "because we were hearing several vendors mention they would probably go ahead and implement the NBS proposal rather than wait for the ISO." He expects that a compromise between the ISO proposal and the NBS proposal will be made without much trouble, paving the way for international approval by the end of this year.

Day explains that the ISO work is not simply bringing together standards proposals from different countries. Rather, it is melting together different positions and suggestions. "Everyone is working so that the protocols are nearly all developed at the ISO level," he says. "The committees from the separate countries are suggesting techniques, making comments and providing analysis."

The basis of the protocol standardization work is the OSI Reference Model, which has itself become a

Draft International Standard at ISO after a vote approving it (11 to 2) was taken this March. Besides the ballots, there were comments that ANSI rules say must be answered before the document can be forwarded to the top of the ISO. The meeting to discuss these comments was held in Paris during the week of June 9th.

For copies of proposed protocol standards contact: ANSI, SC16 Secretariat, 1430 Broadway, New York, NY 10018.

Note: On June 19, 1981 Bob Carpenter, W3OTC gave me single copies of the following documents:

ICST/HLNP-81-1 - Transport Protocol

ICST/HLNP-81-6 - Internet Protocol

ICST/HLNP-81-2 - Session Protocol

They are too fat to reproduce out of our budget, so these single copies are now in the hands of Hal Feinstein, WB3KDU with the hopes that he can digest them and pass along his thoughts to the rest of us. Meanwhile, in addition to the possibility of getting copies via ANSI (above), there is the possibility that you can contact Dr. John Haefner (301-921-1000) at NBS and try to impress him of your need.

Paul, W4RI

2391 Arnold Crescent,
Burlington, Ontario,
Canada, L7P 4J2,
June 22, 1981.

Hank Magnuski, KA6M,
311 Stanford Ave.,
Menlo Park, California,
94205.

Dear Hank:
Please excuse the delay in answering. There is no excuse for my slopiness.
Now on to the good stuff. Your letter arrived with the listing of the packet repeater program. Thanks very much. I am currently working on a PLMX station node control program which should work with the existing point to point software. (PLMX is a compiler for PLM which produces quite good object code.) The individual user will request a connection with the station (VE3PKT Ctrl X) and the station will identify itself back using the user's address. When the user wishes a connection to another a message is sent to the station and the address mapping will be performed by the station in the same way as doug's STOIC version does. The advantage is that the hours (nay months) of coding done by a few of our hardy souls will not be in vain and if the station is down, users can still exchange messages in point to point mode (in fact, the point to point and station modes can co-exist on the same freq. without confusion).

I have not yet re-drawn the schematic of the station node board to include the Intel timer chip (8253?) but have included several copies and a couple with the logic added. One problem (feature hi) the timer has is there is no vectoring of the clock and 8273 interrupts as on doug's board, nor do the clox interrupts operate on edge triggering (bad feature). You have to read off the counters and reset the one which timed out to clear the interrupt. I will eventually figure it out. (reason for this bug is the 8259 interrupt controller chip doesnt work with z-80 processors [interrupt ack different]) With the coming of Doug's new 4x board, we will probably re-cycle this design.

Thanks for the chips. we really appreciate your effort on behalf of hackers everywhere!

73's Stu VE3MWM

2391 Arnold Crescent,
Burlington, Ontario,
L7P 4J2,
June 23, 1981.

Paul Rinaldo, W4RI,
1524 Springvale Avenue,
McLean, Virginia,
22101.

Dear Paul:

I am only part of the way thru digesting the info in the 'packet' you sent recently. I thought it would be appropriate to reply before completing the whole file, however, as much to firm up thoughts in my own mind as to warn of possible problems. You might even find my statements to be quite negative, but the intentions are not. I, as much as anyone, wish to get the best value for investment in packet radio networks. And not just for me or our group's interests but for the amateur community as a whole. You may wish to edit these comments or extract from them but please preserve the intention: best facilities for amateur radio enthusiasts.

Before one can design anything (a car, a network, a movie) one must determine "What is the purpose to be?".

What is the purpose of the packet network which is being set up? Is it to replace RTTY type communication? Is it to augment it? Is it to permit reliable file transfers between amateurs' computer systems? Is it to allow radio CBBSs? Is it to allow experimentation with digital TV? How about Packet Speech? The answer is "yes"! The provision of a service to the amateur community should encompass all the aspirations of the participants. However, we must not forget that one of the main reasons for investigating new communication technology in the Amateur field should be the preservation of spectrum. SSB, Coherent CW, Spread Spectrum and Packet all have one thing in common, they attempt to conserve a scarce resource.

To begin at the beginning, we need some references. Now beginneth the Gospel according to the Literature:

> "Standardization means agreement on reducing the number of ways of doing the same thing. Diversity may be justified when it stems from substantially different constraints or objectives. (...) The term standard should not be taken at face value. In practical terms, standardization does not eliminate diversity and never will. It is only a patient trimming process weeding

out excess diversity." (Pouzin and Zimmerman, A tutorial on Protocols, Proc IEEE V66 n11, Nov '78 pp1346-1370)

"A major deficiency, especially for the level of complexity of X.25, is the lack of mechanism assuring end-to-end integrity of data flows." (Pouzin and Zimmerman, op cit)

"A primary objective of a packet radio network is to support real-time interactive communications between computer resources (hosts) connected to the network and user terminals. In order to satisfy this objective, the network should provide certain basic capabilities ... those which are always provided ... and those which a user may select. The former includes transparency, connectivity, mobile operation, internetting, coexistance, thruput with low delay and rapid deployment. The later includes error control, routing, addressing, and services for various tactical applications". (Kahn et al. Advances in Packet Radio Technology, Proc IEEE v66 n 11 p 1468)

"A privately owned automobile is usually a waste of money! Perhaps 90 percent of the time it is idly parked and not in use. However, its 'convenience' is so seductive that few can resist the temptation to own one. When the price of such a poorly utilized device is astronomically high, we do refuse the temptation (how many of us own private jet aircraft?). On the other hand, when the cost is is extremely low, we are oblised to own such resources (we all own idle pencils)." (Kleinrock, Principles and Lessons in Packet Communications, Proc IEEE v 66 n 11 p 1320)

"F. Stale Protocols
In our experiments ... we have occasionally attempted to adopt a protocol from one network directly over into a new network. We have found that this is a dangerous procedure and must be carefully analysed and measured before one adopts such a procedure. Indeed, the use of old protocols in a new environment is dangerous." (Kleinrock, op cit)

"Extent of message processing in the subnetwork (...) a. A layering of functions, a hierarchy of control, is essential in a complex network environment. For efficiency, nodes must control subnetwork resources, and Hosts must control Host resources. For reliability, the basic subnetwork environment must be under the effective control of the node program - Hosts should not be able to affect the usefulness of the network to other hosts... b. The nature of the problem

of message processing does not change if it is moved out of the network and into the Hosts; the Hosts then have this very difficult job even if they do not want it. (...) d. It is basically cheaper to do message processing in the nodes than in the Hosts and it has very few detrimental effects."(Crowther et al, Issues in packet switching network design, NCC 1975, p 161)

Let me also place a statement here about technology as related to the state of packet networks. The initial packet switching designs (NPL 1965, ARPA II 1969, SITA 1969, TYMNET 1969, CYCLADES/CIGALE 1973, RCP 1974 and EIN 1971-6) were based around either Host systems doing the message processing or specialized minicomputers (IMP in ARPA). The costs for a node were quite high and the maximum return was had thru extensive software. In our case we have an effect we should not disregard. The cost of an intellegent node is considerably less due to the microprocessor's introduction and why shouldn't we take advantage of it. Why adopt (adopt not adapt!) a "stale protocol" based on the minicomputer switch. Let's allow the intellegence of the VADCG board for example to be used. Using SDLC allows us to eliminate the level in the protocol for hop-to-hop acknolwedgement. Let's build on the existing hardware!

The retort is obviously "why not build on the existing software?" meaning obviously "protocols". The software would have to be re-written anyway: why not re-design the protocol to be more appropriate. A radio link is inherently half-duplex. Internet doesn't care. It doesn't acknowledge packets, does no error checking, and can be used most effectively in full-duplex environments. Since we are in a half-duplex mode, efficiency is important (twice as important to be exact) so let the protocol do some error checking and respond in the header about the state of previous transactions! The gain is obvious.

Suppose a datagram of 10000 bits is launched into the network. Because of imposed limitations, the message will be fragmented, conceivably to the limit of 8 octet I-frames each with 60 octets of header. In this limit the network would have to pass about 85000 bits (8 times the original volume). At some point in it's trip, each packet has to be buffered somewhere, totally within the network, and that's only 1 user sending 1/2 a screenful of data! Without error control at the packet level, if one 8 octet packet gets lost, the whole message will require retransmission (170000 bits sent now!) plus parts of the network are out of service during the lifetime of the errant packet (buffers held etc.).

Packet radio (from Kahn) connects terminals. The terminal (we would assume TTY, CRT etc) likes to get messages

in sequence (preferably top down a line at a time!). Fragmented datagrams come in any sequence and require lots of buffering and intelegence to reassemble and assure data integrity. Isn't it a lot to ask a user with a TTY to provide.

One consideration of Hank's to implementing an internet compatible protocol is possible DOD funding. I seriously wonder how much money might be available to re-implement the already invented wheel. The network would not be useful to them for the obvious security reasons. How many of their experts are already working at a much higher level than we? A considerable number, I would guess. (see comments by Kleinrock re Inexperienced Designers)

The June AMRAD Newsletter contains your article entitled "Radio Amateur Technical Achievements". You will observe that the only time the military were interested in Amateur contributions was during the stress of war and preparations therefore. In most cases, Amateurs have lead the way in bringing high technology out from the specialities of Mil-Spec life and using it in a more common-man way. Why must we seek the assistance of the DOD. Get their information (NTIS, Freedom of Information etc.) and learn from their mistakes. Adapt (adapt not adopt) their stuff to common use. Vast amounts of money will be spent in the next few years in bringing the information revolution to the livingrooms of (north) America. This source of money might be more appropriate to try to tap.

Amateur radio is, among other things, people interacting with people. Why not assist non-amateurs to interact by using techniques we can develop.

(Am I being too editorial? Too much preaching, brothers? hi hi. Maybe I should lighten up!)

Technical considerations: all these relate to the use we want to put the network to. Time-sharing of radio channels is well suited to "bursty" traffic: users typing for example, and a file transfer or other non-bursty source will impact performance. The decision needs to be made about how our network should handle this.

A user interested in file transfer needs to be assured of the data integrity in his messages while a user experimenting with packet speech or (real time) imagery doesn't care about the occasional lost packet as long as the delay is as small as possible. We need to figure out a way to accomodate both ends of the spectrum. It seems that datagrams do this by occasionally losing a file transfer packet which a higher level protocol needs to correct while at the

same time removing the possibility of predicting delay, thus making real-timers go thru hell.

I believe the network will develop in the way it will develop! The requirements of the users will mold the development. We already have a tool in the VADCG boards. I don't doubt that it will be replaced by something new when it comes along. Because the uses are unpredictable, the form of the network will also be. New networks will develop to accomodate new applications. All we should do is provide foundations on which similar applications can co-exist. A new user will pick the network most appropriate to his requirements. We shouldn't attempt to be all things to all people.

Yours sincerely,

VE3MWM

2391 Arnold Crescent,
Burlington, Ontario,
Canada, L7P 4J2,
June 22, 1981.

Paul Rinaldo, W4RI,
1524 Springvale Ave.,
McLean, Virginia,
22101.

Dear Paul:

I received the information on modem design you sent. While I am not an expert, It looks as if the scheme will work. The use of individual paths and detectors for the individual tones is more appropriate at HF than the 2206/2211 scheme we use at VHF since it gives you redundant assurance under good signal conditions and still can get data thru when subjected to the selective fading we see at HF.

I will pass the designs along to some other folks who might be interested.

Best of 73's

Stu

VE3MWM/VE3PKT

William Marihugh, K4OS
6419 30 St. South
St. Petersburg, FL 33712
18 June 1981

Mr. Henry S. Magnuski, KA6M
311 Stanford Drive
Menlo Park, CA 94025

Dear Henry,

Reference your article on page 27 of April 1981 QST.

We would like to obtain a description of your packet repeater, including the transmission standards HDLC and CRC together with enough technical references to complete a repeater here in St. Petersburg.

I have enclosed a stamped self addressed envelope for your convenience.

Thanks very much for your interest and time.

Sincerely,

William Marihugh

William Marihugh

8/12

THE AMERICAN RADIO RELAY LEAGUE, INC.

LEADERSHIP OFFICIAL
ILLINOIS SECTION

SECTION EMERGENCY COORDINATOR

ROBERT J HAJEK - W9QBH
PO BOX H
RIVERSIDE IL 60546

- SECTION COMMUNICATIONS MGR
- SECTION EMERG. COORDINATOR
- SECTION TRAFFIC MANAGER
- PUBLIC RELATIONS ASSISTANT
- ADVISORY COMMITTEE MEMBER
- NET MANAGER
- EMERGENCY COORDINATOR
- NTS OFFICIAL

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312/485 3200

24 HOUR CONTACT
312/372 8200
CAR 177

June 13 1981

Mr Paul L Rinaldo W4RI
1524 Springvale Av
Mc Lean VA 22101

Dear Paul:

I received the information on AMRAD from you about the same time I got a small pile of information from one of the local group W9SKD that included copies of a number of issues of the PROTOCOL column. I also received some information on the Canadian activities. It is all very interesting and also contains much material that will take time to digest.

I feel that there is so much background that needs to be filled in and caught up with...but I guess like many things... in time as the pieces all fit together it will be old hat.

Just for background and to give you a better picture of my interest and involvement...I'm 48 and have held an amateur license since 1946...graduated Purdue University 1954 with BSEE...been involved mainly in two-way radio communications for the years and utilize computers in my business...the Datapoint Datashare system with a 5500 for the up and running system while using the older original 2200 for miscelaneous and user software generation.

Since 1968 have been interested in weather communications as related to emergency preparedness (severe weather) and have been subscriber to FAA Service C and A and National Weather Service RAWARC and Illinois State Weather Wire for over 10 years...relaying (in conjunction with Cook County CD until 1975) weather information on 147.06 MHz to what now appears to be nearly 400-500 machines in the Chicago Metropolitan Area. The interest in this seems to be growing.

Since June 1980 I have been appointed the Illinois Section Emergency Coordinator (ARRL) and been working towards an improvement in the general organization and cooperation of amateurs throughout the state relating to emergency communications and public service use of amateur radio.

I am by no means an expert computer hobbyist and am rather scratchy on assembly programming although have little problem working with the higher Datapoint Databus language. It is obvious that much more experience will be gained as there are thoughts of better handling of the weather information in a more automated method than the print and/or torn tape for relay system used now. If I can ever get a committment from NWS as to what the future communications circuits will be and their discipline and content then comes the project of determining the hardware and software necessary to accomplish the following:

1) Receive and store any product that might be used for relay to the amateur network or for local viewing for guidance purposes.
2) Provide handling and semi-automatic relay of information that is determined necessary to transmit to the amateur net to provide warning or lower priority routine weather information
3) Allow printout of any product that has been stored either on a request basis or on a pre-programmed basis.
4) Have the capability to interface with future packet systems to provide selected information to certain destinations (like warnings and related statements to some other part of the state) or allow anyone in the system to extract any product on storage from the database upon request.

This is all a large sized project and will take time but it will also take a bit more knowledge and can be quite an accomplishment. It looks like the future will require 3 basic inputs for weather including the state weather wire at 56.9 baud 5-level...the FAA 604 circuit 1200 baud ASCII either from AT&T or possibly satellite ...and the NWS 1800 baud ASCII circuit which is to be available sometime in 1982 (if they start to make plans on it soon-they made an announcement in January 1981...I believe...to get everyone off their back but have not given it much thought since).

Additionally the manner in which the NTS can be involved in a packet switched system seems to be exciting and I am looking forward to that.

I'll leave you with one more request...that you provide information on any persons in the Chicago Metropolitan Area that are involved and interested in this planning at present. I note recognition of some progress along these lines here in some of the material read...but found only a general reference to Chicago without specifics.

Within the limits of time and resources...I'd like to do everything I can to help promote progress in the area of Packet Switched Info in the Chicago and Illinois area.

73,

Robert J Hajek
W9QBH

RJH:rh
cc: David Borden K8MMO

2391 Arnold Crescent,
Burlington, Ontario,
Canada, L7P 4J2,
June 12, 1981.

Paul Rinaldo, W4RI,
1524 Springvale Ave.,
McLean, Virginia,
22101.

Dear Paul:

First let me appologize for not responding more quickly to your first letter: I wanted to get the input of members of our group. Enclosed you will find a copy of a letter I got from one of our members, who has been involved with data communications for a long time professionally at Univac. It sums up the items the group thought should be included.

Secondly, I received your package of literature yesterday and was interested in the DOD publications (I had seen Kahn's summary before). I will examine the info and probably get back to you after I talk with Doug Lockhart.

Our 4th newsletter has been delayed due to pressures here at work but the end is in sight and it should be out within the next 3 weeks.

Our packet station is progressing: VE3PKT as it is known will operate on 145.65 at 1200 baud from a Z-80 cpu and custom station node software written in PLMX for Z-80. Access will be provided to a CBBS from both radio and dial paths while it will eventually be possible to dial up and get on the air!

Nice to see the STA awarding picture in QST(?).

73's

Stu Beal, VE3MWM/PKT

Thursday, June 4, 1981

Dear Stu:

The letter from Paul Rinaldo is very interesting and brings out many points to consider in the future. Most of my thoughts on the subject concur, but with the following additions:

a. 2 Meters - Experimentation should continue at 1200 Baud for "easy" entry into packet radio, but I feel that all 2.1.1 standard rates up to 9600 Baud should be authorized providing 5 KHz bandwidth is not exceeded. This could be done by combining Quadra Phase Shift and Amplitude Modulation Techniques over short distances.

b. Below 2 Meters - He has more than adequately covered considerations regarding these frequencies. The inherent phase shift over long distances would negate phase modulation techniques here.

c. Above 2 Meters - Unless more 220 MHz equipment becomes readily available it will be some time before our authorization to use this band becomes effectively utilized. I would like to see a similar authorization for a section of the 420 MHz band. I also agree that a standard rate of 48 KB/S (as per CCITT) should be used on these frequencies.

Finally, I am enclosing a copy of the tape made on a high speed copier (15 IPS). If it works let me know and I will make some more up for new enthusiast.

73's,

Frank Roberts

Sent July 81 NL.

311 Stanford Avenue
Menlo Park, CA 94025
June 10th, 1981

Mr. Paul L. Rinaldo
1524 Springvale Avenue
McLean, Virginia 22101

Dear Paul,

Thanks very much for your report on your meeting with the DARPA people, and for the information you sent on the INTERNET protocol, TCP and the packet radio article. I think the INTERNET specification deserves some serious discussion by our group, and the purpose of this letter is to review some of the merits of this standard and how it could be used as the basis of our experimental network.

First, the INTERNET protocol standard is based on the concept of a network which uses a "datagram" as the basic unit of exchange, the basic commodity which is transmitted through a net or between nets. Datagrams are nothing more than packets which have a source and destination address embedded in them and some other control information. The delivery of datagrams through a net is not guaranteed, but is done on a best effort basis. It is the responsibility of the end-to-end communicating processes to check that all outstanding datagrams have been received and correctly ordered, and these processes must be prepared for lost or duplicate datagrams. Much has been written in the literature about datagrams and how they form the fundamental building blocks of networks, and I won't repeat all the arguments here. Let me simply state that many current large scale networks have been built using the datagram concept, and we should not overlook this approach in our design.

About a year ago when I was studying the design of the AMSAT AMICON system, the INTERNET spec first came to my attention. My conclusion then, as you can tell from the first AMICON draft, was that a datagram approach was right for that system. I now would argue that it is also right for our terrestrial networks as well.

Recently I had several long discussions with two people who are professionally involved with computer networking and who are radio amateurs as well. One of these persons is Dave Boggs of Xerox, co-inventor of the Ethernet. Dave described to me how the corporate Ethernet is really a heterogeneous network of Xerox Alto and other types of computers, with links in the network going up and down on a daily basis, with constant changes of equipment and configurations, and with some of the network nodes left on continuously and with some nodes only running 9 to 5 or as needed. Thus, their environment is not drastically different from what we would expect to see in the amateur community, where stations come and go and where elements of the network may be very reliable or very flakey. Ethernet uses a building block called a PUP, which stands for PARC Universal Packet, and which is nothing more than a type of datagram. Dave is a very strong supporter of the datagram approach (almost a missionary) and encouraged me to study his paper describing the PUP (see the April 1980 issue of IEEE Transactions on Communications). Well, it turns out that the INTERNET and PUP designs were one and the same several years ago, and the Xerox people had to split with the INTERNET community in order to tailor certain things for their own net and to get on with the job of implementing Ethernet in a reasonable timeframe.

The other person I talked to was Al Larson of SRI International, who has worked with INTERNET and has some idea of its usefulness and difficulty of implementation. I asked him about his reactions to using INTERNET as a standard for the amateur community and his response, in general, was very positive. We discussed several problems and limitations, and I will relate these later.

Well, let me get to the heart of the matter. I propose that AMNET and AMICON adopt the INTERNET standard intact, with a couple of minor extensions to solve some of our special problems.

First, this protocol is a standard, adopted by the DoD, ARPANET, and supported by many other major packet carriers. It represents the experience of ten or more years of computer networking and the contributions of hundreds of researchers and developers of packet technology. The specification is complete, a publicly available document (through NTIS), and can be used in a fairly simple way by our network. It provides us with the datagram building basis which I feel is important. It conforms to currently accepted practices of multi-layer network design, and could be used both on a national and international basis.

Second, it would make us compatible with DoD and some other networks to which we might eventually want to interface. Amateurs have had a long history of cooperation with the military (MARS, for example) and this would represent a continuation of that cooperation.

Third, it would save us an enormous amount of development time in bringing up our network. I'm really afraid that if we started with something much simpler, as some hams will encourage us to do, we would find in a year or two that features are lacking and extensions are necessary. Much discussion and haggling would produce a new and revised spec, and piece by piece we would eventually reinvent most of the features that are currently in the INTERNET document. I think it's much more reasonable to take this design and declare certain features as optional for our network.

Next, I have not seen any serious counter-proposals on how we should do networking, and I don't know who's going to find the time to write as comprehensive a document as this one.

Finally, I really think that the protocol would work for us, and serve our needs in a reasonably economical manner. The INTERNET protocol permits us to adopt TCP or some other set of end-to-end protocols in the next higher layer of the network. It allows us to use HDLC as the link level and local area network mechanisms for delivering packets to the end-user stations. It's compatible with what we need for the satellite net. It has some really neat features, and I would like to see some comments on why we shouldn't use it.

In looking over this document the application of the standard is fairly straightforward except for one area, and that concerns addressing. A four byte source or destination address is specified, and that does not meet our needs. The first byte of this four byte field represents a network, and about 40 of the possible 256 combinations are already assigned. I attempted to contact the author of the document to see if a number could be assigned to an amateur radio experimental network, or to see if there already was a number for personal computing networks, but John Postel was out of town, and I didn't get an answer to my question. It seems clear that 256 networks is somewhat limiting, and that some future revision of the standard will have to expand this field. In the meantime, we should assume that this field is reserved and not to be used by us, and if we don't get our own network number, we can set the field to zero.

Well, that leaves three bytes or 24 bits of addressing, a selection of 16,777,216 integers which can be assigned to unique entities in our network. That number is large enough to assign each amateur on earth a unique code. Doing that, unfortunately, does not help the routing problem very much because one would need a callbook type of directory to translate these digits into people or places. It also does not take advantage of the uniqueness of callsigns and our familiarity with and use of calls. I propose to utilize the 24 bit address field in the following manner:

> Addresses only have to be assigned to stations serving as network traffic processors, such as repeaters, gateways and mailboxes, and other individual stations do not have to have an address if they are accessible via a local net served by such a gateway or repeater.
>
> The high order 16 bits (65,536 integers) can be assigned to stations based on their geographic location. It turns out that 360 degrees longitude multiplied by 180 degrees latitude provides for 64,800 locations, just under the 65,536 permitted. The remaining low order 8 bits can be sequentially assigned to stations within the same geographic area. If all 256 slots are filled, the nearest open slot can be assigned. Numbers above 64,800 are reserved for satellite stations and special cases. This method of address assignment is both rational and allows repeaters to implement message routing without any prior knowledge of the location of the recipient.
>
> The callsigns of the sender and receiver will be located in the options field, using two of the unassigned control option numbers. Thus the packet header will consist of the standard 20 bytes plus 12 to 16 bytes of options containing the sending and receiving callsign. Explicit routing of messages is still permitted through use of the source routing option.

Some of the complexity of the INTERNET standard could be reduced by restricting use of the following features:

> Fragmentation - Breaking up a packet is not necessary if the buffer allocation is large enough. The standard specifies a 576 byte maximum packet size.

Service Type - this is an option which can be ignored. Useful for interactive vs. batch traffic, or priority message handling.

Security Option - Not required in our network.

Stream Id - Not required

Timestamps - Optional

When we eliminate the requirement for the above items, we really have a basic set of features which are needed for an easy-to-use and versatile network service. Some of the features, such as error reporting, will be necessary to help people figure out what's going on. Other optional features will be useful in testing and measuring network performance.

So, there's a proposal on the table. Can we get some comments?

Best regards,

Hank Magnuski, KA6M

8/12

JAY D. GOOCH W9YRV
1204 N. BERKLEY AVE.
URBANA, ILL. 61801

HANK MAGNUSKI - KA6M
311 STANFORD AVE.
MENLO PARK, CA. 94025

12 JUNE '81

DEAR HANK,

I TALKED TO FLIP RIES ABOUT THIS PACKET RADIO PROJECT FOR CHAMPAIGN-URBANA AND HE SAID HE WOULD HELP.

I REMEMBER YOU SAID YOU HAD SOME VADCG TERMINAL NODE CONTROLLER BOARDS FOR $30.

WE WOULD LIKE TO GET ONE AND WILL SEND $30 PLUS A COUPLE OF DOLLARS FOR POSTAGE. SASE IS ENCLOSED, FOR YOU TO GIVE US OK ON AVAILABILITY. Thanks!

Sincerely,

Jay Gooch

P.S. We need to buy @ 2708 also — or get a listing for them.

J.G.

P.P.S. ARE YOU THE HANK MY FRIEND FLIP RIES THINKS YOU ARE? DID YOU LIVE IN URBANA AND AT COLLEGE HALL???

- J. GOOCH

AMRAD
Amateur Radio Research and Development Corporation

1524 Springvale Avenue
McLean, Virginia 22101
1981 June 8

Hank Magnuski, KA6M
311 Stanford Avenue
Menlo Park, CA 94025

Dear Hank,

Thanks for your thoughtful comments on my trial balloon on packet signaling speeds. I haven't had a chance to bounce your comments off of anyone else yet. But, to keep the dialog alive I thought I would reply now, also spread a few copies of your May 30 letter around so that others could share your ideas.

Well, there are some standards between 9600 and 48000 b/s. They start at 16 kb/s and increment by 8 kb/s jumps. According to what I have read 16 kb/s is considered a very safe speed for networking; we shouldn't disregard it as a possible network speed. However, most new networks these days seem to be using numbers like 56, 64 and 72 kb/s -- speeds in excess of the 48 kb/s speed that you are suggesting may be too fast.

You have a very valid point when you point out that 19.2 kb/s is about as fast as many microcomputers can process. I'm out of my element here, but am I correct in believing that some can't do more than 9600 b/s, particularly when something has to be displayed on the screen? So, I think that we can agree for the moment that we don't want individual microcomputers capable of 19.2 or 9.6 kb/s talking directly to a 48-kb/s network.

This is where we get into architectural philosophy. It is difficult to discuss such involved ideas at such a distance and via letters. However, I'll take a stab at it. Picture, if you will, a VHF terrestrial network consisting of network nodes (call them Station Nodes if you wish to) all (one day) connected together running at 48 kb/s. None of this so far involves the individual ham -- the network is put there by the combined efforts of the network organization and local or regional clubs. If this makes sense for the VHF terrestrial network, let's not assume that this same medicine need be appropriate for other things: (a) the HF subnetwork must follow the laws of ionospheric propagation and therefore have to work somewhere between 75 and 600 baud; (b) the satellite links may be governed by the available/allocated bandwidths; and, (c) the local terminal-to-network node signaling rates possibly should be governed by some other limitations. Expanding on (c), the 19.2-kb/s processing speed that you pointed out is one to reckon with. We might as well also give some heed to the

availability of low-cost, practical modems for individual hams to use at their home stations, also from CBBS's to the network. I think that this boils down to the fact that many people have Bell 103 modems and others have Bell 202 modems, with the latter growing rapidly at the moment for those interested in packet radio. Between those two, I think that we can safely ignore 300 baud (except from landline subscribers talking to CBBS's). That leaves 1200 baud as a possible candidate for use between individual ham stations and network nodes (including CBBS's to network nodes, as the CBBS's in mind would need to come through a licensed ham for proper release of traffic into the network).

This, of course, brings up the horrors of mixed media. Here we would have a network going at 48 kb/s and the local gang talking to each other and to the network nodes at (say) 1200 baud. That translates to RAM buffer storage needed at the network node, which is conceptually where both the 48 kb/s network repeater and the local 1200-baud repeater are colocated. If they are not colocated, then the buffering would have to be one place or the other. On the assumption that they are colocated, I would guess that we are talking about something on the order of a 256-kbyte RAM S-100 computer managing everything. (By the time we get ready to implement most of this, we'll be able to get that neatly on one RAM board.)

With the above situation, we have a 1200-baud stream possibly feeding into a network capable of supporting a 48-kb/s stream -- 40 times 1200 baud. I don't think that this is a bad situation after all because the network node needs to handle some network relaying in addition to introducing and receiving traffic to and from its own area. At the other end of the signaling speed problem, we have the fact that the HF links will be slower than 1200-baud feeds. Thus, there is another need for buffering. I don't see how we can avoid mixed media. So, why not gear up for it?

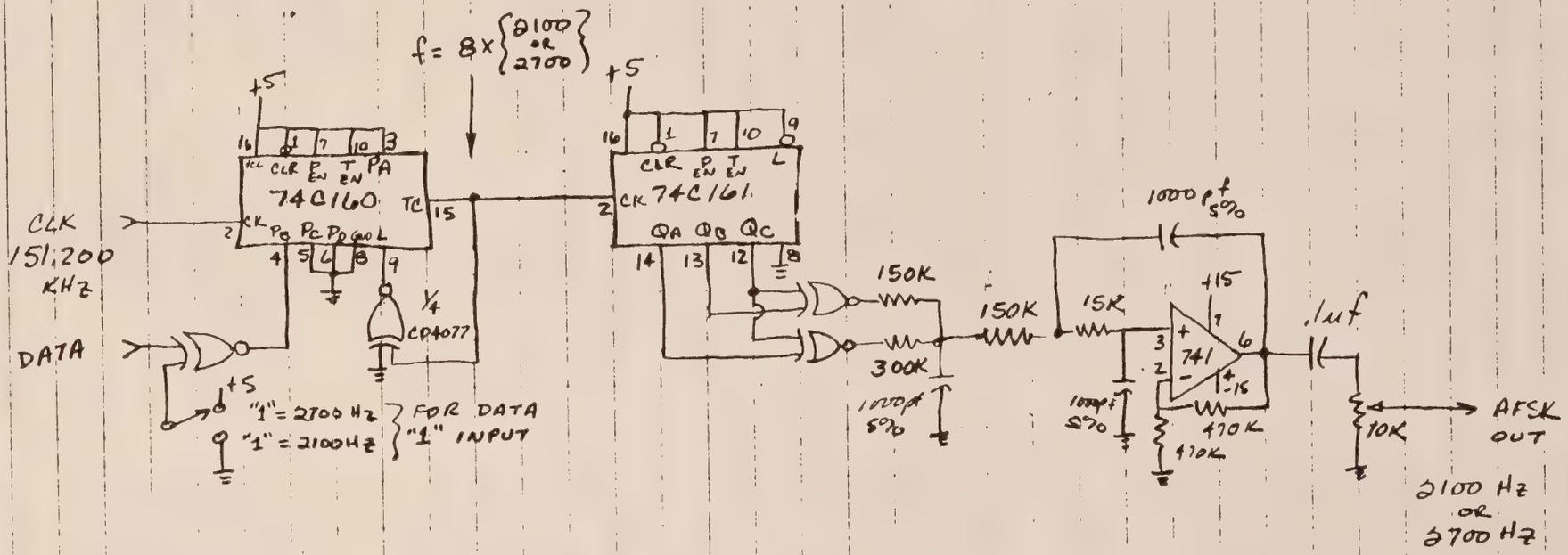
Where this leaves us is that we might be able to see some growth of 1200-baud packets on 2 meters for present local repeaters, either transparent audio (like ours at the moment) or digital packet (like KA6M's). Then we can get about the business of linking between these localities by means of HF (75 - 300 baud for the moment) and VHF (terrestrial)(48 kb/s with an STA), somewhat independently. We will have to pay some attention to packet length -- I'm fearful that we may have to use shorter packets on HF, but don't worry too much until we get some practical experience. I hope that we don't get into a situation where we have a long packet on VHF and have to fragment it for HF transmission.

Does the above make any sense? If not, please feel free to flail away at it. In any event, I would like to see some more comments from any reader. Ideally, I'd like to see us go into the October conference with a fairly firm paper on proposed signaling speeds (not to mention network structure and addressing/routing strategies).

Dist: KA6M K8MMO VE7APU
VE3MWM WB4JFI W1XX
WB5MMB W1EH W3OTC
W1UED W4MIB W4CQI
WB3KDU

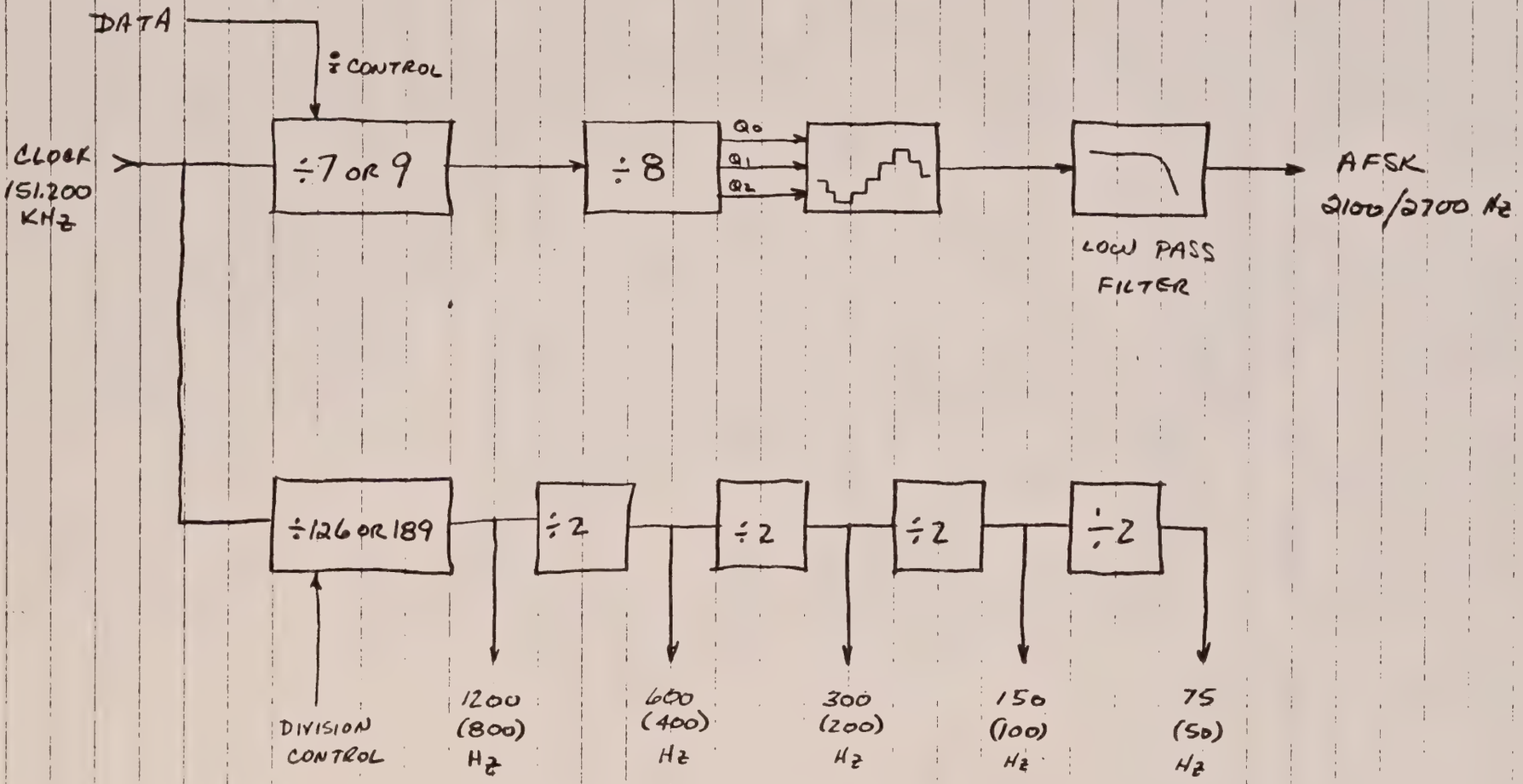
73,

Paul L. Rinaldo, W4RI



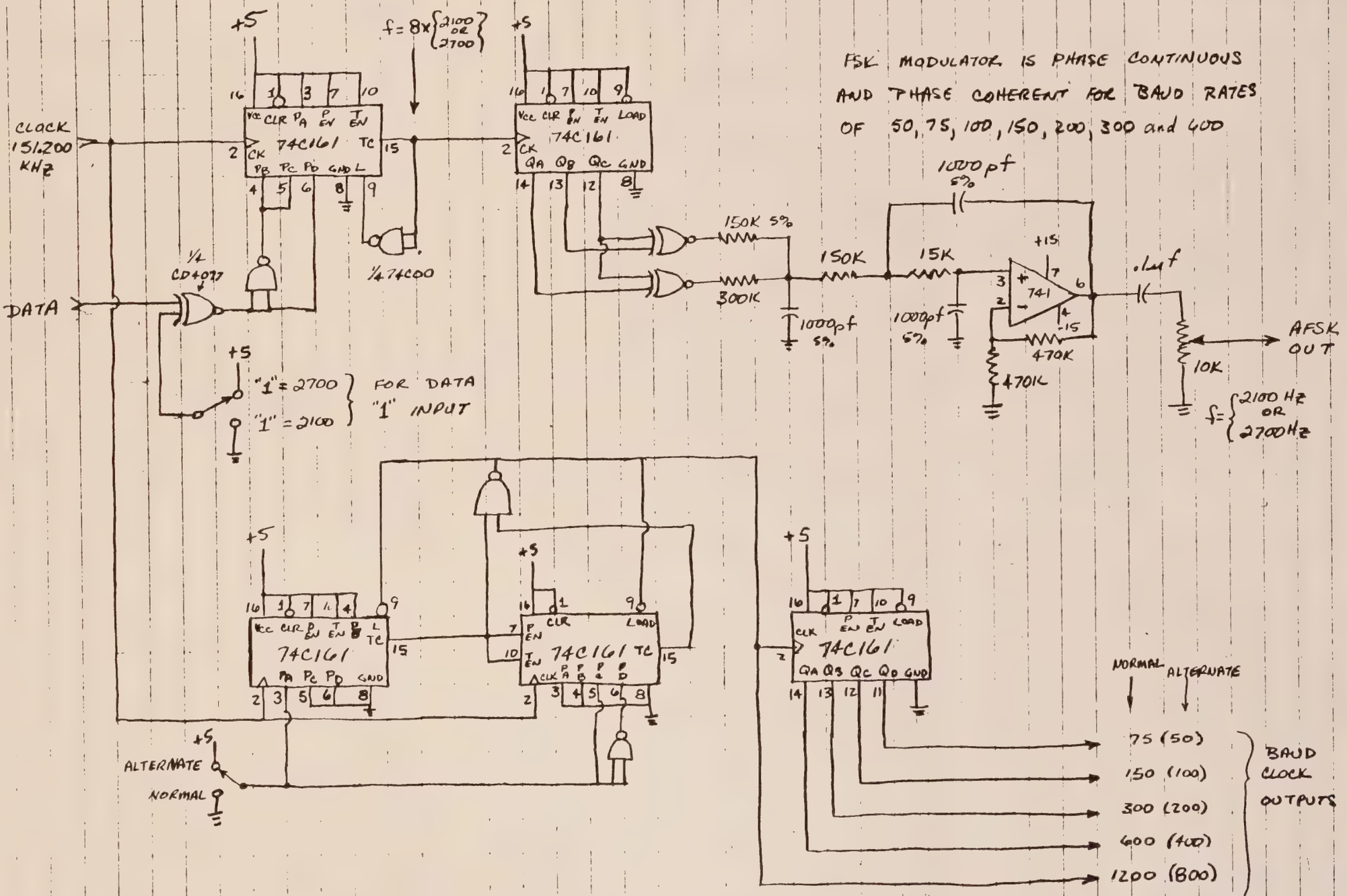
THIS DESIGN IS PHASE CONTINUOUS FOR ANY BAUD RATE AND VIRTUALLY PHASE COHERENT FOR BAUD RATES OF 50, 75, 100, 120, 150, 200, 300 and 600

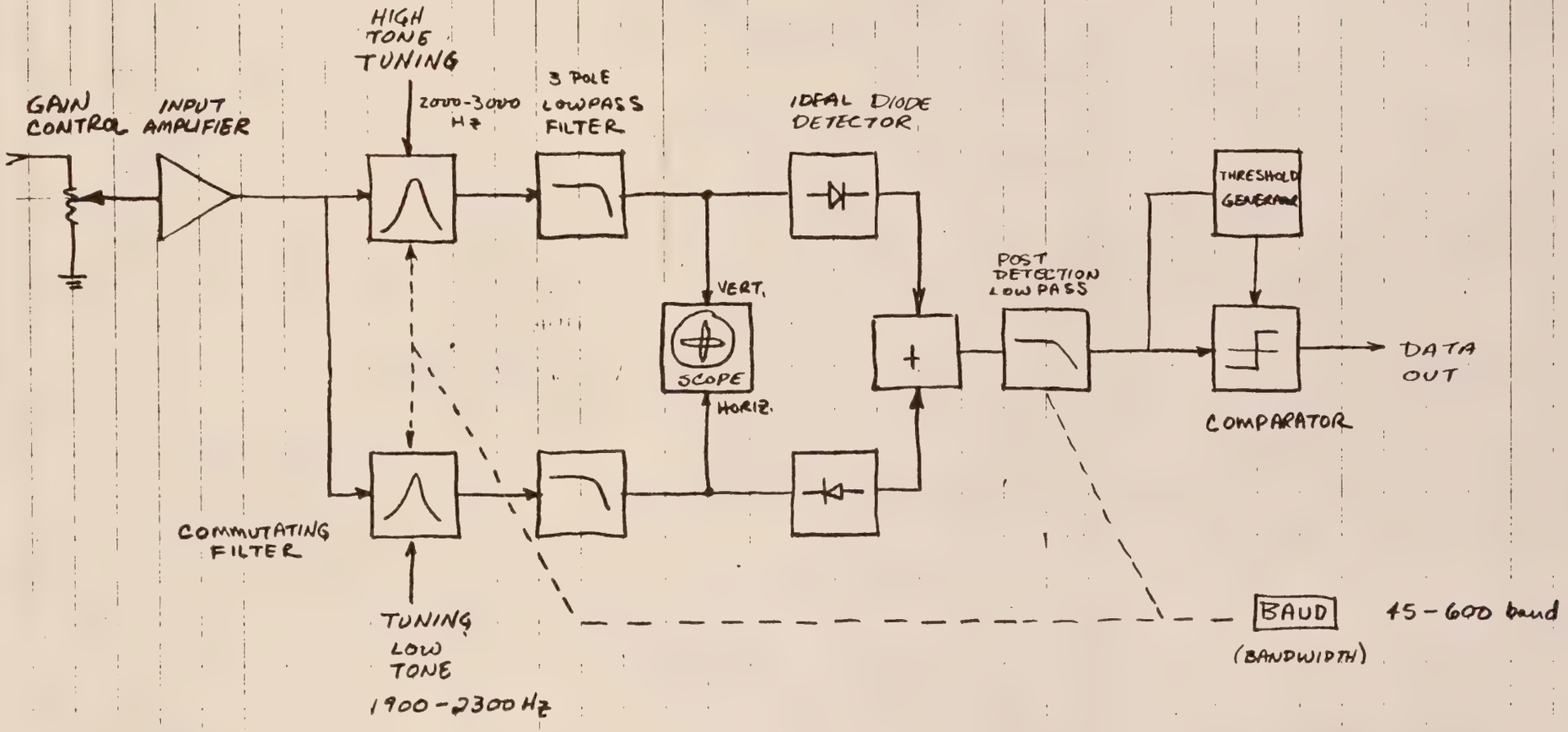
PHASE CONTINUOUS
600 Hz SHIFT
FSK MODULATOR
R. WATSON 31 MAY '81



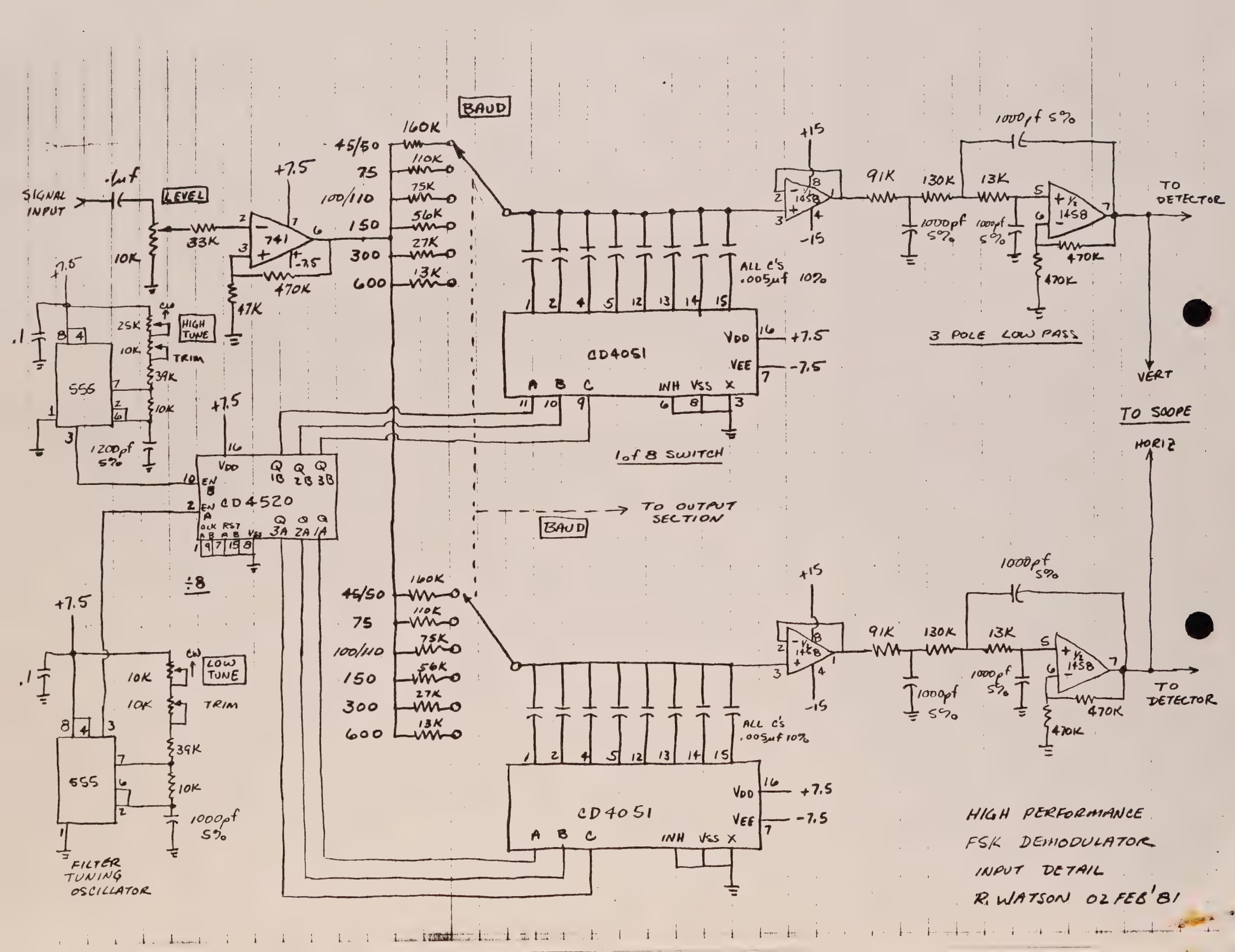
BLOCK DIAGRAM
PHASE CONTINUOUS FSK
MODULATOR AND BAUD
CLOCK REFERENCE

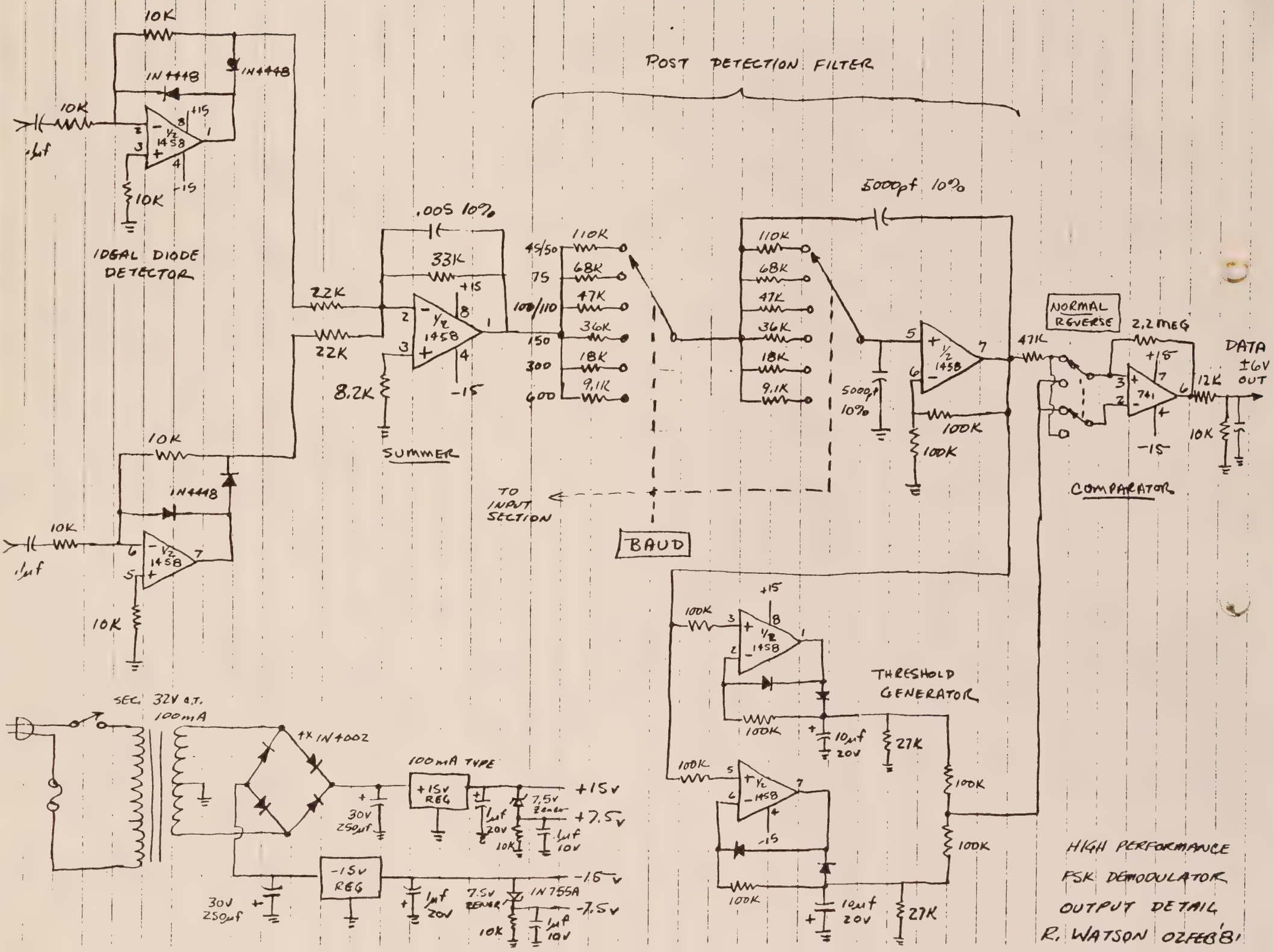
R. WATSON 31 MAY '81


FSK MODULATOR IS PHASE CONTINUOUS AND PHASE COHERENT FOR BAUD RATES OF 50, 75, 100, 150, 200, 300 and 600
CLOCK 151.200 KHz
DATA
+5
f = 8x {2100 OR 2700}
74C161
1/4 CD4077
1/4 74C00
"1" = 2700
"1" = 2100
FOR DATA "1" INPUT
150K 5%
300K
150K
15K
1000pf 5%
1000pf 5%
1000pf 5%
.1uf
741
+15
-15
470K
470K
10K
AFSK OUT
f = {2100 Hz OR 2700 Hz
ALTERNATE
NORMAL
NORMAL
ALTERNATE
75 (50)
150 (100)
300 (200)
600 (400)
1200 (800)
BAUD CLOCK OUTPUTS
PHASE CONTINUOUS 600Hz SHIFT FSK MODULATOR AND BAUD CLOCK GENERATOR R. WATSON 31MAY81



HIGH PERFORMANCE
FSK DEMODULATOR
BLOCK DIAGRAM
R. WATSON 02FEB'81


SIGNAL INPUT
.1uf
LEVEL
10K
33K
741
+7.5
-7.5
470K
47K
BAUD
45/50
75
100/110
150
300
600
160K
110K
75K
56K
27K
13K
ALL C's .005uf 10%
CD4051
VDD
VEE
A B C
INH VSS X
+15
-15
91K
130K
13K
1000pf 5%
470K
3 POLE LOW PASS
TO DETECTOR
VERT
TO SCOPE
HORIZ
1 of 8 SWITCH
TO OUTPUT SECTION
HIGH TUNE
LOW TUNE
TRIM
25K
10K
39K
555
1200pf 5%
CD4520
÷8
FILTER TUNING OSCILLATOR
HIGH PERFORMANCE FSK DEMODULATOR INPUT DETAIL
R. WATSON 02 FEB '81


POST DETECTION FILTER
IDEAL DIODE DETECTOR
SUMMER
BAUD
TO INPUT SECTION
NORMAL REVERSE
COMPARATOR
DATA ±6V OUT
THRESHOLD GENERATOR
SEC. 32V C.T. 100mA
4X IN4002
100mA TYPE
+15V REG
-15V REG
+15V
+7.5V
-15V
-7.5V
HIGH PERFORMANCE FSK DEMODULATOR OUTPUT DETAIL
R. WATSON OZFEB'81

JAY D. GOOCH W9YRV
1204 N. BERKLEY AVE.
URBANA, ILL. 61801

4 JUNE 1981

217 – 367 3101

Dr. Hank Magnuski
311 Stanford Ave
Menlo Park, Calif. 94025

Dear Mr. Magnuski,

Your talk at Dayton last month was very interesting and a sort of exciting eye opener to me. Ive been reading the old Nov. '78 IEEE on Packet Communications since then... Also I talked up your simplex repeater (what I heard you say about it) at the local radio club and talked to my friend Flip Ries, and gave him a Xerox of the Dayton handout. He saw your name and said "I knew Hank real well when he was in school here. Ella and I were good friends of his – he was living at College Hall Ballroom Dorm then etc. So, you're still remembered at Urbana! Flip had a small company that was bought out, then Flip & his partner were left with cash and a yen to get something new started.

Anyway the old U.I. is still here in good shape, but my Kiddo is in your area at the Info. Syst. Lab. (Bernie Widrow, adviser) studying Adaptive Systems.

I'm dumb about packet comm. but intrigued by it. Trying to sell our group on an experiment. With the U.I. W9YH radio club, the HAL Company hams, etc. we should go! Any info on the 8085 Controller (Can

we buy those ④ 2708 proms with the board?)
Is your repeater using protocol with 8273 HDLC ?
And do you think this is the best first step for us?

Enjoyed your presentation at Dayton. Will appreciate advice or references to consult about getting amateur packet comm. off the ground.... I have your sheet on the 8085 board "ASCII INFORMATION ON RADIO .. .. ERROR FREE" etc.

SASE enclosed, and good wishes.

Sincerely,

Jay Gooch
Radio W9YRV
Trustee W9YH

311 Stanford Avenue
Menlo Park, CA 94025
May 30th, 1981

Mr. Paul L. Rinaldo
1524 Springvale Avenue
McLean, Virginia 22101

Dear Paul,

I received your paper on signalling speeds, and wish to thank you for putting together a very useful and positive contribution. I have collected some thoughts on the subject, and here they are ...

The national and international standards you quote are the only ones that I know of also. The speed range between 9600 and 48,000 is not very well covered, and the standards seem to leave a wide gap. In practice I have encountered many situations where 19.2 KB is used, and sometimes 38.4 KB. These are convenient multiples of 9600, and generally have been used in direct connect situations, where no modem was required.

In specifying a channel transmission rate, we must take into consideration the overall system design, and not merely focus on what one particular component can do. As a specific example, 19.2 KB seems to be the limit at which many programmed I/O microcomputers can effectively handle information. This speed allows the program 417 microseconds to handle each byte, which amounts to perhaps a hundred or so instructions of typical microprocessor code. Interrupts can be serviced at this rate, but very little time is left to do any other useful work outside the interrupt system. Most designs running above 19.2 KB are forced to adopt some type of DMA transfer, to cut down on the interrupt overhead. Use of a DMA chip complicates access to memory, and generally results in a slightly more expensive design. If we want to run at 48,000, we had better be prepared for more complex interfaces to our microcomputers. The VADCG hardware does not have a switch setting at this speed, and I don't know if Doug has ever tested it to see what its maximum performance limits are. This would be a good experiment if it hasn't already been done.

In asking for high-speed STA's and explaining to others the need for fast signalling rates, I think it is very important to mention the fact that in using multiple access protocols the real channel throughput is only about 20% to 50% of the channel Baud rate. People not familiar with this type of operation don't realize the importance of keeping the channel lightly loaded.

The AMICON system specifications have expanded their scope somewhat since the May 1980 release of the first draft. In addition to the original L2 channel, there is the possibility of L band transponders on the B spacecraft, and also L band work on the SYNCART satellite planned for the 83-84 timeframe. The SYNCART hardware is going to have a dedicated, hard-limiting 10 KHz IF reserved for packet radio use, and I think we can assume that Phase III B & C bands will permit us at least that much room in the L band, as the B & C total bandwidth is several times larger than projected SYNCART band.

It seems to me that it would be unwise to spec a different modem for each one of these services, and certainly a good design for a high performance unit would allow a change in bandwidth through switch settings or replacing some kind of filter card. Thus, I see the packet radio services breaking down into the following three categories:

Low performance (75-300 Baud) --

Usage: HF, Telephone
Modem: RTTY or Bell 103

Medium performance (600-1200 Baud) --

Usage: 2 meters, VHF & UHF voice channels
Phase IIIB & IIIC L2 Channel
Modem: Bell 202 Compatible

High performance (9600-48,000 Baud) --

Usage: 220 MHz backbone repeater net,
L Band Phase IIIB and Phase IIIC
L Band Syncart

What to specify for the L2 channel is a continuing problem. The simplest system would be NBFM-AFSK using 202 modems. This is a proven technology, and people have the equipment. However, the bandwidth used is wider than desired, and some other form of coherent modulation might give higher speeds and better performance using less bandwidth. Unfortunately, nothing of the sort is in common use by radio amateurs, and the equipment would have to be designed from scratch and tested carefully. The closest thing available is the PSK equipment used for the Phase III telemetry. Needless to say, some proposals are needed in this area.

Thanks for taking the time to kick off the discussion on this topic.

Best regards,

Hank

Hank Magnuski, KA6M

( )

AMRAD

Amateur Radio Research and Development Corporation

1524 Springvale Avenue
McLean, Virginia 22101
1981 May 25

Dear Networkers,

In re: Signaling Speeds

It seems prudent for us to start a dialog on packet network signaling speeds. The main reason is that we should be asking the FCC for a Special Temporary Authority (STA), then a permanent rules change permitting higher speeds than those now allowed for ASCII. I have done some research and wish to share what I have found so that we can eventually reach some common understandings.

First, I'd like to start by listing the existing standards on speeds.

American National Standard: synchronous signaling rates for data transmission, ANSI X3.1-1976, paragraph 2. Standard Signaling Rates reads as follows:

> "2.1 The standard serial signaling rates shall be 600 X N bits per second, where N may be any positive integer from 1 through 16.
>
> "2.1.1 The preferred standard signaling rates shall be 600, 1200, 2400, 4800, 7200, and 9600 bits per second.
>
> "2.1.2 For those applications requiring synchronous operation below 600 bits per second, the standard signaling rates shall be 75, 150, and 300 bits per second.
>
> "2.2 The standard parallel signaling rates for equipment designed to operate with up to 8 parallel data bits per character shall be 75 X N characters per second, where N may be any positive integer from 1 through 16.
>
> "2.2.1 The preferred standard parallel signaling rates shall be 75, 150, 300, 600, 900, and 1200 characters per second."

American National Standard: synchronous high-speed data signaling rates between data terminal equipment and data communication equipment, ANSI X3.36-1975 reads:

> "2.1 The standard signaling rates used for data transfer at rates above 9600 bits per second shall be selected integral multiples of 8000 bits per second.

"2.2 The selected standard signaling rates shall be:

16 kilobits per second
56 kilobits per second
1.344 megabits per second
1.544 megabits per second*

"2.3 For those applications where established practice requires the use of the internationally recommended rate for wide-band transmission, a rate of 48 kilobits is recognized.

*This rate will be subject to coding restrictions in many applications involving public networks, as noted in the Appendix.

The Appendix discussed 1.544 megabits per second as it pertains to PCM telephone transmission. It goes on to say:

"The only standard for wide-band data rates now in existence was adopted by the International Telegraph and Telephone Consultative Committee (CCITT) in 1968. This standard specifies a rate of 48 kb/s for synchronous operation with an option of 40.8 kb/s on an exceptional basis... The 48 kb/s must be recognized for those who are involved in operations extending beyond the United States, but it is not a preferred rate for use in the United States at this time.

"Widespread application of data rates between 9.6 and 48 kb/s has not as yet taken place, but there has been considerable experimentatal application of a number of different rates in this range by government agencies. A rate of 16 kb/s has been chosen as the best estimate of an intermediate rate in this range at the present time, with the expectation that additional rates will probably be added in the future as more experience is gained in different applications."

CCITT Recommendation V.35, Wideband Modems, adopted in 1968 and amended in 1972 and 76 is obviously the CCITT standard alluded to in the above appendix. V.35 describes modems for asymmetric SSB AM modulation of a 100-kHz carrier for frequency-division multiplex transmission. The modem involves a scrambling process. CCITT Recommendation V.36 is closely related. It notes other data signaling rates of 56, 64 and 72 kb/s used by different nations internally and internationally by bilateral agreement.

Now for some practical applications of these speeds within the proposed packet network. It seems to me that we should consider four problems: (1) 2-meter experimentation, (2) 220-MHz packet repeaters for the terrestrial net, (3) HF transmissions, and (4) satellite net (AMICON).

Packet transmissions on 2 meters seem to have settled on 1200 b/s using Bell 202 modems. This is true in the Vancouver, Hamilton, San Francisco, Washington, DC and possibly other areas in Canada. How long it will/should stay this way is open for discussion. However, at the moment it looks like the only practical thing to do because of the ease of using AFSK over existing FM transceivers and repeaters and the ready availability of 202 modems. In the U.S., present rules permit up to 1200-baud operation on 2 meters. The ARRL petition RM-3788, Use of Additional Digital Codes in the Amateur Radio Service, requests that the speed limit on 2 meters be increased to 4800 baud. The use of 2 meters is thought to be constrained by considerable FM voice repeater congestion in populous areas. I.e., there is the feeling that the FM hordes would descend upon us if we went after more bandwidth than that used by FM voice repeaters.

The 220-MHz band requires some priority consideration. It represents both an opportunity and a problem. The opportunity is that 220 is relatively unspoiled and under occupied. The problems are that (a) not many of us have 220-MHz transceivers, perhaps none with the right gear, and (b) the top speed permitted in the U.S. at present is 1200 baud - obviously we want to go higher. It should be noted that the Canadians have rules permitting use of speeds which produce up to 100-kHz bandwidths in the 223 - 233.5-MHz subband. It looks to me as though 220 MHz should be used for the bulk of the terrestrial VHF network packet repeaters. (We can keep 2 meters for voice service channel uses.) Also, I think that we should ask the FCC for an STA permitting 100-kHz bandwidth for packets in the 223 - 233.5-MHz subband so we can set up a packet repeater in the Washington, DC area. Doug, VE7APU has mentioned that he would like to see 48 kb/s as the standard signaling rate for 220. I think that 48 kb/s makes a lot of sense because: (a) it is fast, thus permitting lots of throughput and channel sharing, (b) it is a standard international speed, and (c) if F1 emission is used, 48 kb/s will just about fill up a 100-kHz wide channel. To pursue that point, here is the calculation of bandwidth using the formula in §2.202 of the FCC's rules.

$$Bn = 2.6D + 0.55$$

Where:

Bn = Necessary bandwidth in hertz.
B = Telegraph speed in bauds.
D = Half the difference between the maximum and minimum values of the instantaneous frequency in hertz.

Thus: (for 48 kb/s, F1, 48,000 Hz shift, synchronous)

$$Bn = 2.6 \times 24{,}000 + 0.55 \times 48{,}000$$

$$Bn = 88{,}800 \text{ hertz}$$

Adding a little to prevent ringing in the filters (multiply X 1.1), the bandwidth would translate to 97,680 hertz, filling up the 100 kHz.

I recognize that there are different ways of calculating bandwidth and that the above may not be the most accurate. However, it seems to be desirable to use a formula that will be recognized by the FCC when arguing that they increase the U.S. 220-MHz ASCII speed limit to that authorized in Canada.

Doug points out that the higher speeds will require a "full quieting" signal, thus packet repeaters need to be well sited with respect to their neighboring repeaters. That could translate to one every 50 km or so. Where these 220-MHz packet repeaters would have to be located throughout the U.S. and Canada would be a good study subject for someone. At very least, we need some research done on what the VHF terrestrial network could look like when completed. Some thought should be given to the separate roles that could be played by these packet repeaters -- that of network node and a repeater facility serving the local area users.

Now, on to HF signaling speeds. Here is an area where we will have to do some experimentation. The enemy is multipath. If you could always operate at the MUF for the path, you could send almost any speed because there would be only one path through the layer. However, the HF ham bands are now only every octave, the exception being 21 MHz which falls between the 14- and 28-MHz bands. The addition of bands at 10 and 18 MHz can really help this situation for the longer HF paths. There remains a 2:1 gap between the 3.5- and the 7-MHz bands which will make it difficult for the shorter HF paths where multipath is most restrictive. (It would really be nice to have a packet frequency near 5 MHz.)

The worst case situation on the HF bands for multipath is in the vicinity of 100 km (near vertical incidence paths) where the maximum expected time delay difference at frequencies well below the MUF could be a little more than 8 ms, say about 8.5 ms. A delay difference of 8.5 ms would permit signaling rates up to 58.8 baud. So a flat statement can be made that we don't ever need to design for less than 58.8 baud for any HF path, any frequency. However, things get better as the path gets longer. For example, the best worst case at 3000 - 6000 km is 166.7 baud. These worst-case signaling speeds versus path distances are given in Fig. 1, which is based on Fig. 5 of Roger K. Salaman's, A New Ionospheric Multipath Reduction Factor (MRF), June 1962 issue of IRE Transactions on Communications Systems.

Fig. 2 shows the maximum signal rates in bauds as a function of path distance and where you are with respect to the MUF. It is derived from Fig. 4 of Salaman's paper which also appears as Fig. 10 on p. 28-9 of the IEEE Reference Data for Radio Engineers, 6th edition. Like Fig. 1, described above, it assumes a speed based on a 50% overlap of code elements.

K&E SEMI-LOGARITHMIC 46 5490
3 CYCLES X 70 DIVISIONS MADE IN U.S.A.
KEUFFEL & ESSER CO.

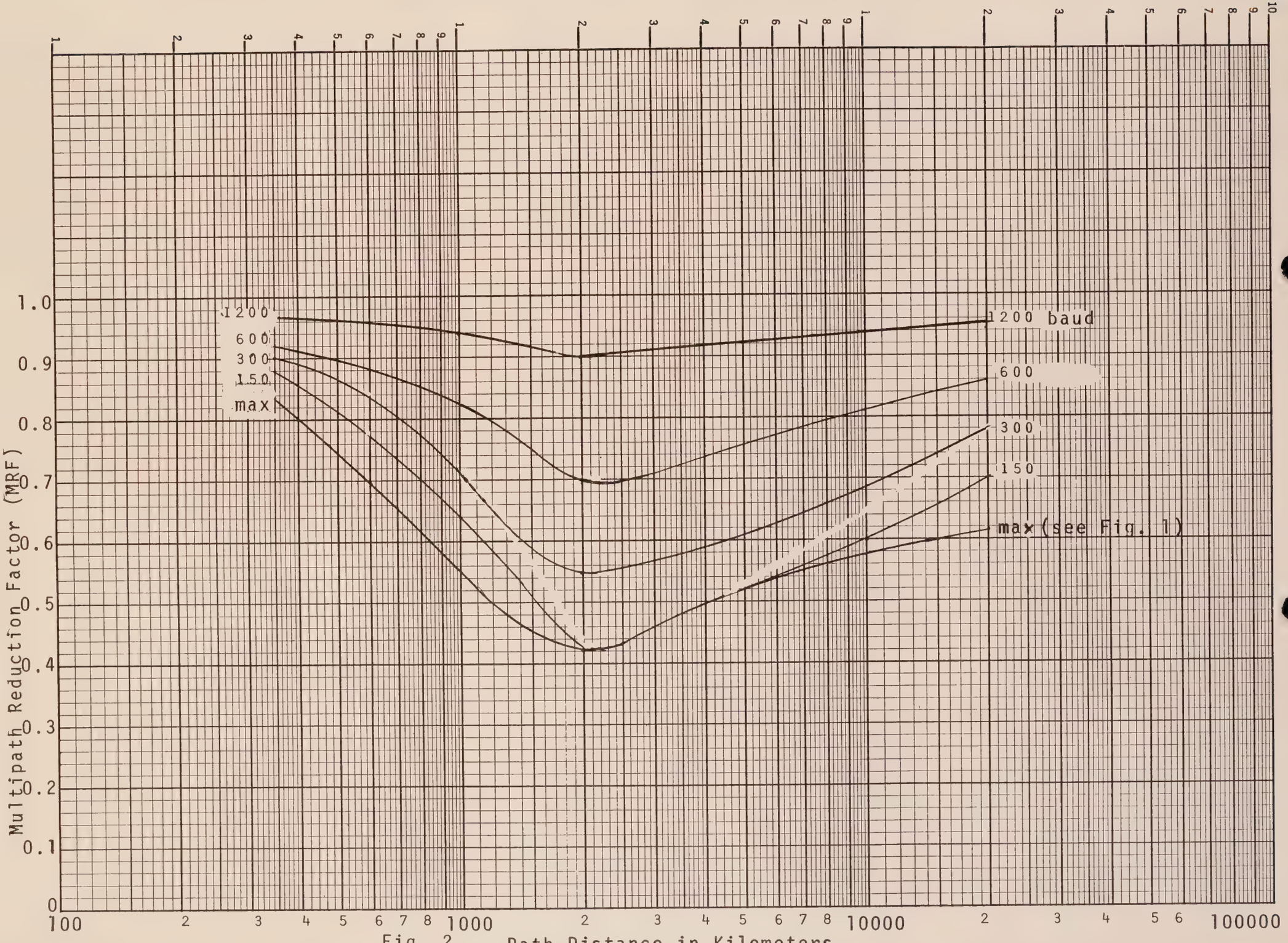


Fig. 2.

K&E SEMI-LOGARITHMIC 46 5490
3 CYCLES X 70 DIVISIONS MADE IN U.S.A.
KEUFFEL & ESSER CO.

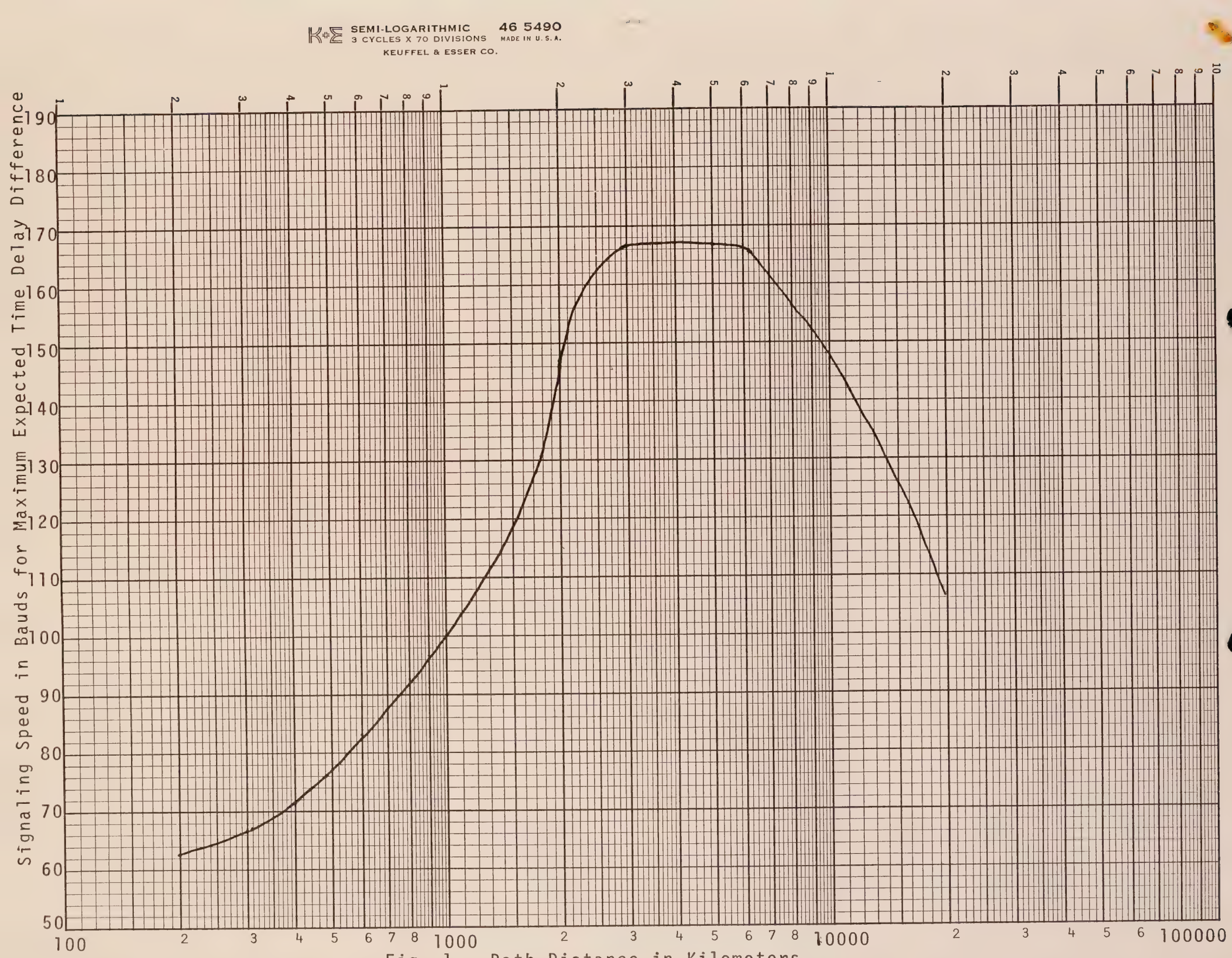


Fig. 1. Path Distance in Kilometers

So, on to a practical example. The HF path from Washington, DC to Newington, CT is 490.2 km (304.6 mi). Referring to Fig. 1, the worst case for the maximum expected time delay difference over that path is about 77 baud - close enough to 75 baud. That's why we think that 75 baud is a safe speed for this path. However, if you check Fig. 2., it is possible to operate at 150 baud down to 81% of the MUF and 300 baud down to 87% of the MUF. Thus, if you could pick frequencies and/or times of day, higher speed operation would be possible. But, because the operating frequencies for this path would be roughly 3.6 and 7.1 MHz, the frequency spread is such that one cannot rely on being 80-some percent or better with respect to the MUF. So, in this case, it looks like 75 baud may be it for the Washington-Newington path. In any case, we'll experiment. If 150 baud works on a practical basis, perhaps we can go to that speed. It would be nice if the baud rate for the HF station node packet controller could be software selectable.

It can be seen from Fig. 2 that 600 baud signaling speed could be practical for paths ranging from 1600 to 5000 km (about 1000 to 3000 mi). I would expect that we can safely run 150 baud, usually run 300 baud and sometimes operate at 600 baud over these path lengths, e.g., coast-to-coast. Again, it would be useful to have the speed adaptive. Because 600 baud is sometimes useful at HF, I think that we should ask the FCC for an STA to permit it -- the rules permit only 300 baud now. Later, we can petition them to increase the speed to 600 permanently.

To summarize the HF signaling speed requirements, I see it as 75, 150, 300, and 600, preferably adaptive/software controllable.

Concerning signaling speeds contemplated for satellite operations, the AMICON System Specification of April 1980 does not nail it down. The parenthetical statement under paragraph 1.1 suggests that the L2 channel 3-dB bandwidth will be 2.4 kHz. That might suggest a signaling speed of 1200 baud. Perhaps Hank can clear this up or at least outline the range of possibilities for L2.

Now it's your turn. Do you have any more information and ideas that could move this subject along?

73,

Paul

Paul L. Rinaldo, W4RI

Dist:

K8MMO	VE7APU
KA6M	VE3MWM
WB4JFI	W1XX
WB5MMB	W1EH
W3OTC	W1UED
W4MIB	W4CQI

AMRAD

Amateur Radio Research and Development Corporation

1981 May 22

FOR IMMEDIATE RELEASE:

For more information contact:
Paul L. Rinaldo, W4RI
703-356-8918 days/eves

CALL FOR PAPERS ON PACKET RADIO AND COMPUTER NETWORKING:

The American Radio Relay League is sponsoring a conference on Amateur Radio Computer Networking on October 16, 1981 at the National Bureau of Standards, Gaithersburg, MD. The purpose of the conference is to explore the possibilities of an integrated amateur computer network using HF, VHF and satellite packet radio as the primary transmission means. The network would consist of radio amateurs in both the U.S. and Canada and would provide means of servicing the public by handling third party traffic. Papers are sought on both technical and operational topics including: network structure, protocols, message handling, equipment design and selection, software, integration with the National Traffic System, interconnection with Computerized Bulletin Board Systems, and other topics. This event will be hosted by the Amateur Radio Research and Development Corp. (AMRAD) and by the Radio Amatuer Satellite Corp. (AMSAT) whose annual meeting will be held on October 17 at the nearby Goddard Space Flight Center. Those wishing to present papers should send a letter of intent to Paul L. Rinaldo, W4RI, President, AMRAD, 1524 Springvale Ave., McLean, VA 22101 before August 15, 1981.

AMRAD

Amateur Radio Research and Development Corporation

1524 Springvale Avenue
McLean, Virginia 22101
1981 May 22

Dear Packeteers,

This is to fill you in on Perry Williams' and my visit to the Defense Advanced Research Projects Agency (DARPA), on May 12. This is for your information and not for publication.

As an outgrowth of a meeting some months ago, Perry made an appointment for us to see Dr. Robert E. Kahn and LTC Larry Druffel of the DARPA Information Processing Techniques office, in Arlington, VA. Kahn, as you may know, is well recognized for his development of ARPANET and Telenet strategies.

We spent about an hour. Druffel is a former ham. But, we found it useful to explain ham radio to Kahn. We then gave him a copy of our AMNET HF proposal which calls for 7 fixed nodes and one portable. Kahn's reaction was that we didn't cover the proposed network structure and protocol. We explained that these were being ironed out. It became clear that he feels it necessary to have these details worked out, and to his satisfaction, before he could give us any endorsement of the proposal. However, he did offer to critique our proposal when these details are included. Kahn said that he was interested in it. He pointed out that there is no new technology involved in what we're doing, thus DARPA is not the office to fund it. However, he suggested that the Defense Communications Agency would be the right place to fund application type projects.

Kahn agreed with our choice of HDLC but would not go along with X.25. He said that in order to get any DoD support, we would need to be compatible with the DoD Standard Transmission Control Protocol (end-to-end) and DoD Standard Internet Procotol (gateways). He also recommended that we read his paper, Advances in Packet Radio Technology which includes ARPANET lessons learned. Copies of these three documents are enclosed.

As you will hear separately, the ARRL has agreed to sponsor an amateur computer networking conference on October 16, 1981 at the National Bureau of Standards, Gaithersburg, MD, the day before the AMSAT annual meeting in Greenbelt, MD. AMRAD and AMSAT will host. So, I plan to rewrite the HF proposal as a paper to present at the conference. Meanwhile, I'll need various inputs on proposed structure and protocol and will appreciate any/all help. The DARPA endorsement is not absolutely vital, as is any DoD funding support, but it seems wothwhile to look into this possibility and - if it looks to be feasible - give it another try.

73,

Paul L. Rinaldo, W4RI

PERROTT ASSOCIATES, INC.

Pat Perrott K4RXT
1900 Fawsett Road
Winter Park, FL 32789
(305) 644-0065

To: Hank Magnuski **Date:** 5/22/81

From: Pat Perrott K4RXT

Subject: Digital Communications & Packet Radio

Dear Mr. Magnuski:

I am the Florida representative for Siliconix, Inc. and during a visit there last week spoke with Mr. Art Fury regarding transmission of computer data via an RF link. He advised me of your efforts and the demo you gave.

If there is any information you can provide me in this regard I would really appreciate it. Basically I would like to be able to communicate with a Digital Equipment Corp. PDP11 via UHF Ham frequency at a very high baud rate. Your help is most appreciated.

Very truly yours,

Pat Perrott

PP/ah

Sent 8/12/81

THE AMERICAN RADIO RELAY LEAGUE, INC.
HEADQUARTERS SOCIETY OF THE INTERNATIONAL AMATEUR RADIO UNION
ADMINISTRATIVE HEADQUARTERS NEWINGTON, CONNECTICUT, U. S. A. 06111

HARRY J. DANNALS
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W1RW, TREASURER
RICHARD L. BALDWIN
W1RU, SEC. & GEN. MGR.
203-666-1541
QST
OFFICIAL JOURNAL

20 May 81

Dear Hank,

How goes it? I'm still not completely recovered from Dayton — I've been on the road most of the time since then. It was great meeting you at Dayton. Hope to see you in DC this fall.

Would you mind responding to this letter. I think you are much better qualified than I am.

How's the ~~QST~~ articles coming?

73

Pete

Pete O'Dell
QST

A. R. R. L. TECHNICAL INFORMATION SERVICE

To assure best service, technical queries are answered in memo form by the member of the ARRL technical staff most familiar with the subject. For reference, your letter is returned with the answer. No copies are kept, so if you have any further questions on the same subject please return the entire file. Answers to technical questions will be expedited if they are written on a separate sheet, not combined with matters that must be handled by other departments at ARRL Headquarters.

Sent
8/12/81

16 MAY 1981

Hank Magnuski KA6M

311 Stanford

Menlo Park, California 94025

Dear Mr. Magnuski

I am interested in obtaining information on your work with packet switching techniques. Chuck Swedblom (WA6EXV) was in attendance at the recent West Coast UHF Conference in Sunnyvale, where he listened to your talk. Chuck suggested that you might be willing to supply addition information on the packet network in your area. I am interested in obtaining as much technical information as you are willing to pass along; on the RF link, protocall,modulation method and the microprocessor controlled interface board.

Enclosed is a self addressed envelope, please feel free to fill it up.

Sincerely

Alan Kirk

Alan Kirk WB6HLZ

303 Leyte Road

China Lake, California 93555

003

16 MAY 1991

Hank Mazurski KA6M

Menlo Park, California 94025

Dear Mr. Mazurski

I am interested in obtaining information on your work with wireless switching technology. Glynd Tweedie (WA6EXV) was in attendance at the recent West Coast UHF Conference in Sunnyvale, where he listened to your talk. Chuck suggested that you might be willing to supply addition information on the packet network in your area. I am interested in obtaining as much technical information as you are willing to pass along: on the RF links, protocol, modulation method and the microprocessor controlled interface.

Enclosed is a self addressed envelope, please feel free to fill it up.

Alan Kirk WB6HLI

303 Leyte Road

Menlo Park, California 94025

12 MAY 81

DEAR HANK,

JUST SAW YOUR LETTER TO PAUL. HAVE BEEN DRAGGING MY FEET ON SENDING YOU MONEY FOR YOUR DISK YOU SENT. SORRY - MONEY ENCLOSED. $5 ✓

BOY DO WE NEED 8273'S. I TRIED TO GET ONE FROM OUR LOCAL INTEL OUTLET. $67 CERAMIC AND $60 PLASTIC. PLEASE SEND 5 JUST AS SOON AS YOUR ORDER COMES IN. I THINK YOU ASK $34. IF IT IS MORE, LET ME KNOW. $170 $175 ✓

I JUST GOT MY BOARD FIRED OFF. I AM NOW MODIFYING MY IC22S FOR PACKET (EASY!) AND UP MY POWER TO 50W. BILL MORAN W4MIB HAS HIS BOARD RUNNING. TERRY WB4JFI IS DONE AND MODIFYING A RIG. WE ARE CLOSE TO GETTING WITH THE PROGRAM.

✓ I WOULD REALLY LIKE TO SEE THE SOURCE CODE FOR LIPM AND TIPM. DOUG'S CODE IS THE ONLY EXAMPLE I HAVE ON HOW TO HANDLE THE SOFTWARE.

IF YOU HAVE ANY SCHEMATICS OF CIRCUITS USING THE WESTERN DIGITAL CHIP, PLEASE SEND ONE ALONG. I THINK YOU SAID THE CHIP WAS $26. PLEASE SEND ONE OF THOSE ALSO. WE NEED TO GET A STORE & FORWARD NODE GOING, PROBABLY 5100, N FORTH OR PASCAL CODE. $26 $30 ✓

YOU SAID YOU HAD AN EXPENSIVE MODEM (202) LEFT. PLEASE SEND ONE. $100 X

ALL THIS REQUIRES POSTAGE, YOU MIGHT NOT LIKE SHIPPING THIS STUFF ALL OVER THE US, BUT WE REALLY APPRECIATE THE HELP. CANADIAN MAIL IS AWFUL. THANKS FOR ANYTHING YOU DO FOR US. $10

$311 TOTAL

ARE YOU CURRENTLY WRITING AN ARTICLE FOR QST OR SOME OTHER MAGAZINE? I WRITE ARTICLES AND DON'T WANT TO COLLIDE OR STEAL YOUR THUNDER. THERE IS PLENTY TO WRITE ABOUT. I NOTICE THE CANADIANS JUST PUBLISHED A BOOK (TITLE "PACKET RADIO" - CATCHY PHRASE).

I AM LOOKING FORWARD TO LINKING OUR TWO AREAS AS SOON AS POSSIBLE. THANKS AGAIN FOR HELPING.

73'

DAVID BORDEN, K8MMO
RT2 BOX 233B
STERLING, VA.
22170

PHONE WORK (202) 767-5400 X 240
PHONE HOME (703) 450-5284

DISK #1	5	
SA873	175	
1933	30	
DISK #2	5	215
4 x 8273	140	35
	355	250

AMRAD

Amateur Radio Research and Development Corporation

1524 Springvale Avenue
McLean, Virginia 22101

1981 May 11

Hank Magnuski, KA6M
311 Stanford Av
Menlo Park, CA 94025

Dear Hank,

Enclosed is a check in the amount of $18 for the EPROMS which arrived today. Thank you.

Bill Moran, WB4MIB got his Vancouver board up last Monday night. Ditto for Dave Borden, K8MMO early Saturday morning. Both have minor handshaking problems at the moment. Terry Fox, WB4JFI is not far behind. He should get his going sometime this week. That is the ARRL's board, not Terry's personal one. That leaves Sandy, WB5MMB and myself taking up the rear at the moment.

I just got the word from ARRL Hq today that they will indeed sponsor a packet/networking meeting on October 16 at Gaithersburg, MD. AMRAD and AMSAT will co-host. I'll get out a call for papers within a week or so.

Tomorrow, Perry Williams, W1UED (ARRL Washington Coordinator) and I are going to ARPA to discuss the HF packet network proposal. Wish us luck.

Who is your HF gateway volunteer? It looks like both we and the ARRL should be ready in July for HF tests. Chris Schenck at W1AW has scrounged up HF radio equipment and an RTTY modem. We expect some antenna problems up there because they don't have anything suitable for this short path. We'll run some CW or SSB tests first.

Here is what I asked Doug to burn for the HF EPROMS (I haven't heard from him since):

Terminal End: 300-baud ASCII
1 start bit
8 data bits (last one being parity)
Ignore parity (e.g., my printer will perform no parity checking and will generate a space for parity.)
1 stop bit

That's about as far as I could pin things down. I asked him to use the call sign WD4IWG, which is AMRAD's club call.

Dave says that he'd like to have the source code for these EPROM's.

73,

Paul L. Rinaldo, W4RI

W. A. Linstruth, WA6JPR
2413 Burritt Avenue
Redondo Beach, CA 90278
(213) 542-3290
Micronet: 70250,272
Source: TCC427

07 May 1980

Dear Bob:

I am writing to tell you how much I enjoyed reading your letter in the AMRAD NEWSLETTER of May 1980.

I am working with the group (AMICON) which is designing protocol standards for use on the computer communications channel which is included in the AMSAT Phase III satellite bandplan. I am also very interested in terrestrial packet radio (and land-line) techniques as a hobby pursuit.

My task for AMICON is to build a bibliography of articles regarding protocol design for use by the group. The AMRAD paper was, in fact, sent to me by the AMICON chairman so that I might include your references in my bibliography. As a result of this task, I have been doing quite a bit of reading in the field. The thing that strikes me as odd is the fact that so many people are involved in this pursuit but everyone seems to be working in a vacuum, or at least with little feedback between groups. This is partly due to the fact that we are all trying to design communications networks, for whatever purpose, without first having a common system, or medium, with which to compare notes.

I have been doing my "low profile" bit to try to cross-pollinate or cross-reference the people and groups who are most active in amateur packet switching techniques. It is in this spirit that I am writing to you. I would like to inform you that we are out here (which you may already know) and to invite you to help me with my self-appointed task of trying to get those of us most serious about packet communications talking to one another.

Please write or call if this interests you in any way and I'll see to it that your interest is made known to the rest of the AMICON group and to anyone else who will listen. I am particularly interested in learning of any reasonably inexpensive means by which we might correspond as a group (Telenet, EIES computer conference group discount, etc.) which you may be familiar with.

Sincerely,

Wally Linstruth

Bob Carpenter, W3OTC
12708 Circle Drive
Rockville, MD 20850

cc: Vern 'RIP' Riportella, WA2LQQ, AMICON chairman
David W. Borden, K8MMO, AMRAD Newsletter - PROTOCOL column
Dave Caulkins, PCNET committee
Hank Magnuski, KA6M, AMICON protocol committee
Kelly Smith, SIG/M coordinator, CP/M-Net owner

HI Hank,

I am trying to get a little dialog going here.

I am a member of CALTUS radio club. If you haven't heard we have a UHF relay system that stretches from S.F Bay area through L.A. and on to New Mexico. They may cooperate in allowing me to access your repeater from here. If you would like to try let me know.

Please send an 8273 board and chip. If <u>ANY</u> modem is available please let me know. I <u>have</u> a coordinated repeater that covers most of S.W. L.A. and a spare CRT etc. etc. with an interface and some software I could have a digipeater on the air in a couple of weeks. Can you help.?

Thanks & 73

Wally

5-15-81

Dear Hank,

Thanks for the info on George + Bruce. I haven't talked to Bruce yet but as it turns out, George is an old friend of mine who is very interested in this sort of thing.

My Florida commitment keeps accelerating so I may not get anything going prior to my return. I am now scheduled to leave about June 22 and return on Aug 21. I may be able to switch my return ticket to a triangle route and visit D.C. I don't know the geography there and thought you may know someone I might touch base with to visit AMRAD, AMSAT etc.

The main thing holding up a start here is a MODEM if you know of anything available that won't require a lot of development work, please advise.

→ me)

So far, I've only had two replies to my "broadcast" letter (including yours). The other was from Kelly Smith. He seems really enthusiastic and is about 40 miles North of me over very hilly terrain. If we can find a ham who is local to him it ought to be a great path to test a mtr propogation of packets. Kelly is going to forward my letter to Sol Libes of S-100 MAG. as he is doing articles for Sol and feels that S-100/MICROSYSTEMS might be a reasonable newsletter vehicle to help the divergent groups keep in touch. He also runs one of the all-time great (I.E. 10 MEG DISK - MP/M) Remote CP/M systems.

Thanks for your help & 73

Wally

P.S. I don't know if I mentioned it but I have 2 S-100 systems running and I will talk to myself if necessary to get packet-noise going on 2 m. also, I have included my latest resume for your info.

WALTER A. LINSTRUTH

----------Resume of Qualifications------

2413 Burritt Avenue
Redondo Beach, CA 90278
Telephone: (213) 542-3290

PERSONAL: Born: August 10, 1943 — Health: Good.
Family status: Married, four children.

CAREER OBJECTIVE: I am seeking a responsible position in the telecommunications and data processing field which will present a challenge to my varied background and talents in system integration, test and management activities.

EDUCATION: California State University, Dominguez Hills
Bachelor of Science, Business Information Systems
March 1981, with honors.

EXPERIENCE: April 1967 to present
TRW Defense and Space Systems Group, Space Systems Division
Redondo Beach, CA

* FLTSATCOM Integration and Test department, 1974 - present -- Performed hardware and software related design verification, integration, acceptance test and operation of a complex communications spacecraft test system comprised of dual IBM 1800 data acquisition computers and associated space-ground link communications equipment. Supervised the design and maintenance of the spacecraft calibration data base, the design, test and operation of a multi-processor communications link and assisted in the automation of an existing attitude and control system test set using a desk top computer. Responsible for computer operations on all launches to date, including coordination of activities related to the temporary relocation of the IBM computer test facility to the Air Force Eastern Test Range, Cape Canaveral, FL. Current title is Supervisor, FLTSATCOM Computer Test Operations section. I manage (including C/SCSC responsibility) technical operation and maintenance personnel, spacecraft data analysis engineers and a data-base update clerk.

* DSCS II Integration and test department, 1969 - 1974 -- Computer operations. R.F. (X-band) payload integration. Launch operations, flights 1-4.

* Integration Support department, 1967 - 1969 -- Eage technician/unit engineer, satellite test conductor console and associated computer interfaces.

March 1962 to April 1967
The Pacific Telephone and Telegraph Company
El Segundo, CA

* PBX repairman, Special Services (Teletype repair).

HOBBIES: Jogging, personal computers, telecommunications, amateur radio, photography, water skiing, tennis. District Communications Officer, Los Angeles County Disaster Communications Service.

REFERENCES: Available upon request.

27 April 1981

Dear Hank,

I was very interested in your article in QST on the new packet repeater in the San Francisco area. A group of Amateurs here in Germany in the US Army are working toward a standardized format for ASCII MARS message traffic. None of us are familiar with the HDLC format you described in the article. Since any step towards standardization always pays big dividends in the long haul, we are obviously interested. Unfortunately, getting information here in English is a time consuming process. I am hoping you might be able to provide me with a brief description of the HDLC format, or at least tell me where I could find the information. Any assistance you could render would be greatly appreciated.

Vy 73
Hank

Hank Phillips
DA1TN/AA4HP

R.L.[illegible]
[illegible] 27 PM 3:11

1040 SW 61 Av
Margate FL 33068
23 Apr 81

Pete O'Dell KB1N
c/o QST/ARRL
225 Main St.
Newington, Ct 06111

8/12

Dear Pete,

Enjoyed the short article on Packet switching. Would like more info. How about an article. Most HDLC systems I know of are synchronous, but the 202 is asynchronous (no clock on DTE interface). Which do you use?

Can I obtain enough information to duplicate this system on VHF or UHF, such as memory maps, schematics and prom programs? Can one of those Electronic Systems modem boards be used in place of the 202 modems (don't I have a 202!)

Thanks for any help you or Hank can give.

Sincerely
Ernie Johnston WB4LVA

April 15, 1981

Mr. Hank Magnuski and Mr. Pete O'Dell
311 Stanford Ave.
Menlo Park, CA 94025

Dear Hank and Pete,

I read your article on packet data transmission in the April 1981 QST magazine with great interest. For the last year or so I have been throwing around a few ideas with some friends here in Los Angeles. We are in the process of defining a packet protocol for amatuer radio data communications and I would be very interested in exchangeing notes between our two groups.

Once we have defined our system requirements we intend to install a VHF or UHF repeater here in the Los Angeles basin exclusively for packet data transmission.

I would like to see the various groups in the country who develop this new means of communications work together so we all don't reinvent the wheel or go off and develop incompatable systems.

Any information you could send regarding this project would be greatly appreciated. I would be happy to respond in kind.

Sincerely

George Zafiropoulos

George Zafiropoulos - WA6YPS

3721 Mc Laughlin Ave.
Los Angeles, CA 90066
Home phone (213) 398-3858
Work phone (213) 546-4564

Sent 8/12/81

6 Apr 81.

CHET RICE
115 Evergreen Dr.
Kentfield, Calif. 94904

DEAR HANK — (KA6M)

HEARD YOUR TALK AT THE ACS BREAKFAST, AND READ YOUR INFO SHEET IN "PARAGRAPHS" FOR APR. 81 — CONCERNING YOUR PACKET RADIO REPEATER. — AND NEEDLESS TO SAY, I'M INTERESTED! — ESPECIALLY SINCE I'M INVESTIGATING GETTING MYSELF A MICRO-COMPUTER IN THE NEAR FUTURE. — NEEDLESS TO SAY, I'VE GOT A LOT OF STUDYING TO DO FIRST — BUT IT SEEMS SENSIBLE TO INCLUDE "PACKET RADIO" AS ONE OF THE JOBS I WANT TO DO WITH A NEW COMPUTER. SO I GUESS MY NOTE ONLY SERVES TO PROVIDE SOME ENCOURAGEMENT FOR YOUR ACTIVITY — AND TO ASK THAT IF YOU EVER PUBLISH AN ARTICLE — TO LET ME KNOW - SO I CAN GET A COPY —

73 CHET, WA6PAC

I would greatly appreciate a reprint of your ~~article~~

formation on the packet repeat and/or

a list of references to your work.

which appeared in noticed article in AMRAD NEWSLETTER

Vol. _____ Page _____ 19 _____

Very truly yours,

(cut here for address label)

Richard W. Doering, WA6CFM

(please print)

BUILDING 316

Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439

Note: If supply is exhausted please return request card indicating this.

ANL-99B (9-75)

THIS SIDE OF CARD IS FOR ADDRESS

Hank Magnuski
311 Stanford Ave
Menlo Park, CA 94025

Sent 8/12/81

USGPO 1978 752-804/100 Region 5-I
821-719

Sent 8/12/81

WILLIAM M. MORAN
109 MILL ST., N.E.
VIENNA, VA 22180
703 - 938-6924

TO KA6M Hank

DATE 17 Mar 81

SUBJECT Packet Radio

Dear Hank:

I was searching for your address in the call book when the mail arrived with the VADCG Packet Newsletter.

I would appreciate it very much if you would send me whatver you have on the operation of your Packet Repeater. Congradulations on your big first in ham radio I expect the future will look back with some satisfaction on your accomplishments.

I was seriously wondering if you can send me some sample of the messages forwarded on the network. I would also like to have some detail on how the operator prepares and puts a message into the system. This may sound like a silly question but then I am not an experienced data communicator just a simple ham trying to get a handle on a new thing.

I currently have an H-19 Terminal I built. The computer is a Digital Group configuration I built up from DG boards and has Z80 CPU, I/O bd, TVT64, 48 K RAM, a Hamboard, and the Conrac 21 inch monitor. The next installation now on the bench is the Floppy disk controller board-double density(ADOS) and the Shugart 8" drives(ready and waiting. I have just finished testing and modifying a 202 modem which seems to work fine and I have finsihed the VADAC Packet Board. The big hurdle is the preparation of the EPROM chips. Local AMRAD fellows are talking about and some are in the initial stages of building the VADAC bd and the netting will be limited to the VHF simplex and 147.21/81 repeater. I am essentially more interested in the HF part of the activity.

Question: How do I take care of the EPROM preparation if I cannot yet burn them.(I have the ZERLIP EPROM board but I have an S100/DG bus interface problem I must whip.

over please

DAY/TIMER Time Saver® REORDER FORM No. B2380L. DAY-TIMERS, Allentown, Pa. 18001

My previous question has a few other questions implied such as Is there an EPROM preparati activity going on in the acket field? How does one hindle multiple uses with the single packet board? I do not mean the replacing of one EPROM w th another, but the procurement of the essential program data. Now that I have put it on paper it looks like an almost gigantic question. Hi.

I am retired and 65 years young. So much has passed under the bridge for me and here I am trying to catch up to a new thing. Well I will stay with it until it gets going faster than I can. But in the meantime I'm trying.

I am intrigued by the possibility of the nationwide net and that is what prompts the questions about the program in the EPROMs.

Now I know all your effort must cost something and I am willing to give some support. Tell me if you have a Packet newsletter or a membership or what and the cost. SASE enclosed.

I get the information from the AMSAT people that they are very interested in allocating a slot in the Phase III B(oscar) for Packet the questions I could ask about that use dare not even be put in print as yet. I might get thrown out on my ear. Never-the-less some brave soul will ask them and some giant brain will answer them and I will hope to have the answers come my way.

From my small letter you must get some idea of my curiosity and lack of detailed information. ~~xxxxxxx~~ Sometimes I have the information and I can't recognize it because it has not found a place in my brain the first time through. But a few times through the light comes on and then many pieces seem to fall in place. Hi.

Excuse the poor ribbon on this machine I guess I should take time out from playing in the radio room to get this job done.

Hope you have much fun and success with your repeater and maybe it will be written up for one of the Ham journals.

73

Bill Moran
W4MIB

311 Stanford Avenue
Menlo Park, CA 94025
March 17th, 1981

Mr. Paul L. Rinaldo
1524 Springvale Avenue
McLean, Virginia 22101

Dear Paul,

Thanks very much for your letters of February 14th and 23d and the AMNET specification. I have shown this correspondence to Howard Nurse also, and we are in the process of reviewing it. We will have some response for you on both topics as soon as possible.

The current status out here is that three VADCG boards are fully operational, one more is done awaiting EPROMS, and we have commitments from three more hams to join the net. Two of the running boards are at home stations, and the third is tied to a computer running a timesharing system. Thus, we already have a mailbox system on packet. Also, there will be a short article in QST in April based on the repeater announcement (must be their April Fool article). It's been very enjoyable moving into the operational stage after so many months of talking, planning and building.

Very much appreciate your taking the time to talk to all the big wheels out there on the East coast. I wonder if we could get a connection from AMRAD to out here using ARPANET as the transcontinental carrier. Do you think Vinton Cerf (DARPA) and his group would view that as an interesting educational experiment? It seems that quite a few other interests have gotten grants to use ARPANET, why not us, particularly since they started this packet radio business.

I've done a major overhaul of the VADCG point-to-point programs, and here are some of the ideas I've included:

CW Identification and timer
Send packet on input overflow
Clean up garbage after a connection
Flow control on input/output
Dynamic address change option
Delete key function
Prints packets from the repeater
Retry count exhaust during a session
Host computer options
Powerup message to console

This is just frosting on the cake. Doug's programs are really quite decently done and good examples of how to implement HDLC protocol. What I'm going to try to convince him to do is to merge his station and point-to-point versions into one unified program which could be used in both environments.

Also, the 8273 chips are in. Price is $34 plus $1/chip for postage and handling. Tell me how many you'd like.

I've thought long and hard about arranging a trip to Dayton, but the time and expenses are pretty substantial considering there is no formal agenda planned. If we could get some working papers assembled and then meet later in the year I think I could manage that. The next phase of what I plan to do concerns thinking about the higher level protocols and issues of routing and end-to-end performance in larger networks. We need proposals in that area, like your AMNET paper, to sort out what kind of services we wish to establish, and to determine what's going to be practical.

So much for now. I've been invited to speak before no less than five radio groups (including the ham club at SRI, world HQ of government packet radio) on this subject, so I'd say there's just a little bit of interest out there in these ideas.

Keep up the good work,

Hank Magnuski

AMRAD

Amateur Radio Research and Development Corporation

1524 Springvale Avenue
McLean, Virginia 22101
703-356-8918
1981 February 23

Dear Hank,

Could either you or someone you know help with some monitoring to find some clear packet radio (HF) frequencies? The immediate purpose is to get some frequencies picked for the AMRAD-ARRL HF packet link. But, eventually, we'll need some for all bands to use as regular packet network frequencies. I have sent this same request to others around the country and a few in Canada to get the ball rolling.

We're also getting some real interest going here on VHF packet. Besides myself and Dave Borden, Terry Fox (WB4JFI), Sandy (WB5MMB) and Bill Moran (W4MIB) are getting set up using Doug's boards. Cliff Pittelkau (W4CQI) is teetering. We're talking about a 220-MHz packet repeater and later on linking up the East coast.

I may have a couple of orders for your $34 chips in a few days. I'll let you know.

73,

Paul

Paul L. Rinaldo, W4RI

AMRAD

Amateur Radio Research and Development Corporation

1524 Springvale Avenue
McLean, Virginia 22101
1981 February 24

To: HF Packet Radio Enthusiasts

It is desirable to do some frequency planning for packet radio network channels on HF. Thus far, the only frequency that has been nominated for this type of operation has been 14076 kHz, which has been used for a packet beacon in Vancouver, BC and perhaps elsewhere. The goal is to come up with one primary and one alternate frequency within each present amateur band.

To help focus on the problem, the following table summarizes the existing frequency situation:

Canadian Amateur F1 Alloc.	U.S. Amateur F1 Alloc.	Considerate Opr's Freq Guide QST*	W1AW RTTY Freqs	Existing Nets	Proposed Packet Freqs
3500- 3725	3500- 3775	3610- 3630	3625	3610 3615 3620 3617.5 3630	_____
7000- 7150	7000- 7150	7090- 7100	7095	7090	_____
14000-14100	14000-14200	14080-14100	14095 cw14080	14075 popular autostart freq	14076
21000-21100	21000-21250	21090-21100	21095		_____
28000-28100	28000-28500	28090-28100	28095		_____

*QST, page 47, Jan 1981.

Prior to proposing specific frequencies, it would be useful to conduct a frequency occupancy survey. The enclosed forms are designed to help you record RTTY activity on the subbands suggested in the "considerate Operator's frequency guide" except that the 14-MHz subband has been lowered to 14075 to reflect actual usage and to include the 14075 autostart frequency as well as 14076 kHz.

One log form should be started for daytime (dawn to dusk) and another for nighttime. Please record all RTTY activity by making a pencil/pen mark on the frequency. If you judge that the RTTY signal is so weak that it wouldn't interfere with your receiving a typical strength RTTY signal, leave it blank. Do not record CW or other than RTTY emissions. Use a receiver bandwidth of approximately 1 kHz.

This frequency survey is meant to be done on a time-available basis. If you can, please try to include some observations during the evening hours when most net activity takes place. In order to include as many observations as possible to get a representative sampling, you may wish to enlist the help of another listener in your area. Please listen whenever you can over the months March and April, 1981 and return your logs to AMRAD, 1524 Springvale Ave., McLean, VA USA 22101 for correlation.

We appreciate your help.

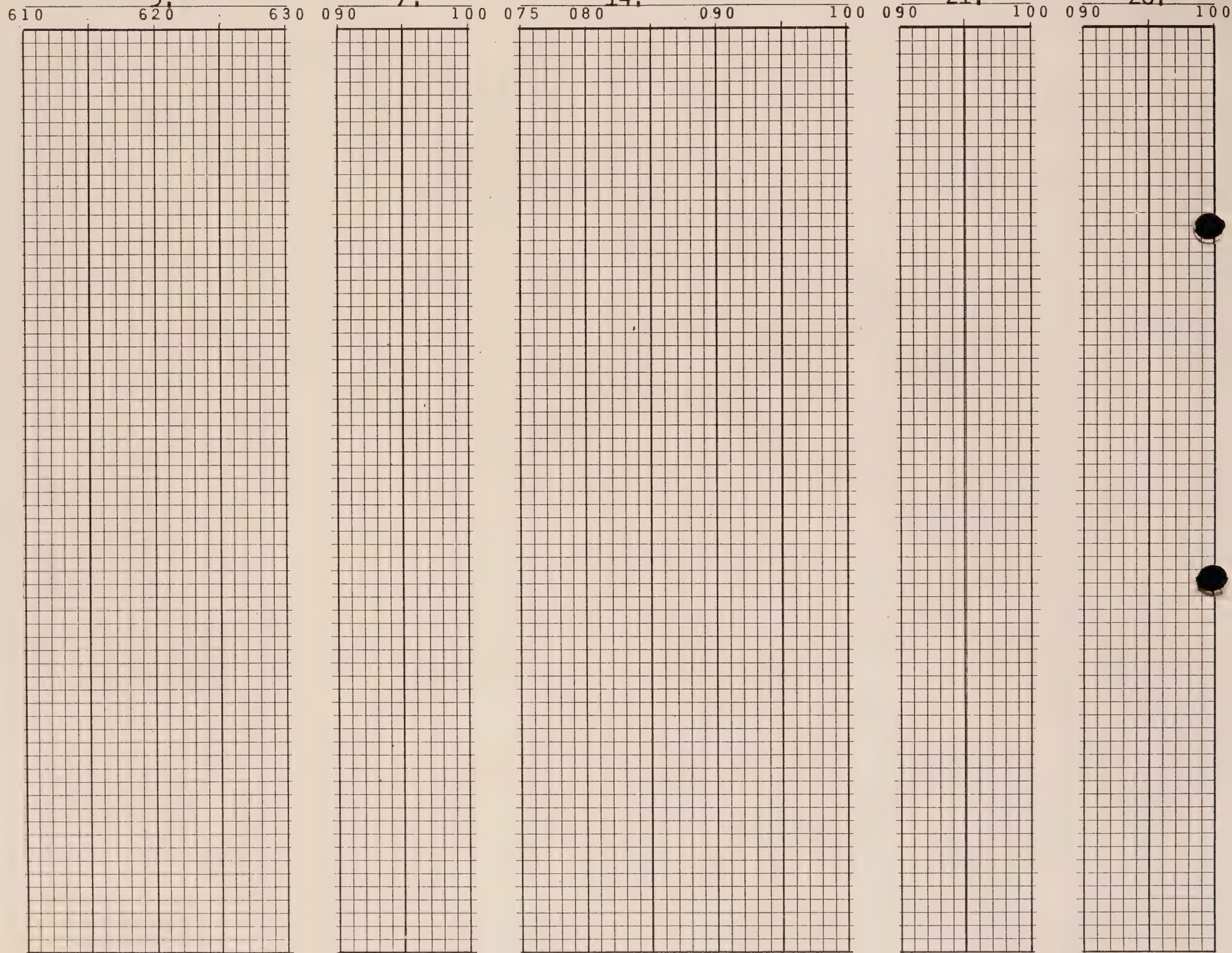
73,

Paul L. Rinaldo, W4RI

p.s., If you can't do the above survey, please pass this package on to someone else in your area who has the time and equipment.

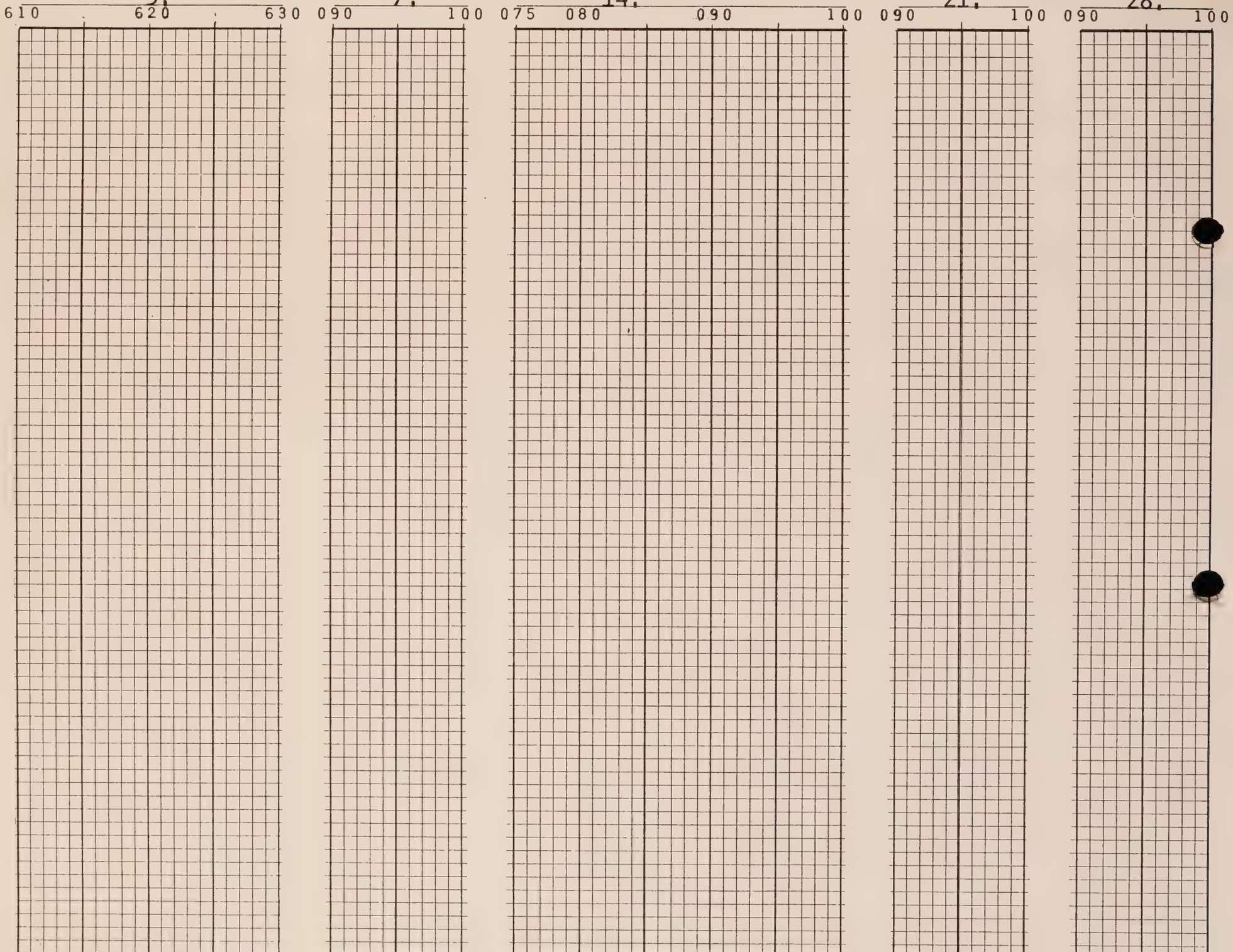
Station _____ RTTY Frequency Activitv Log ☐Day (7→28 MHz) ☐Night (3→14)

Dates



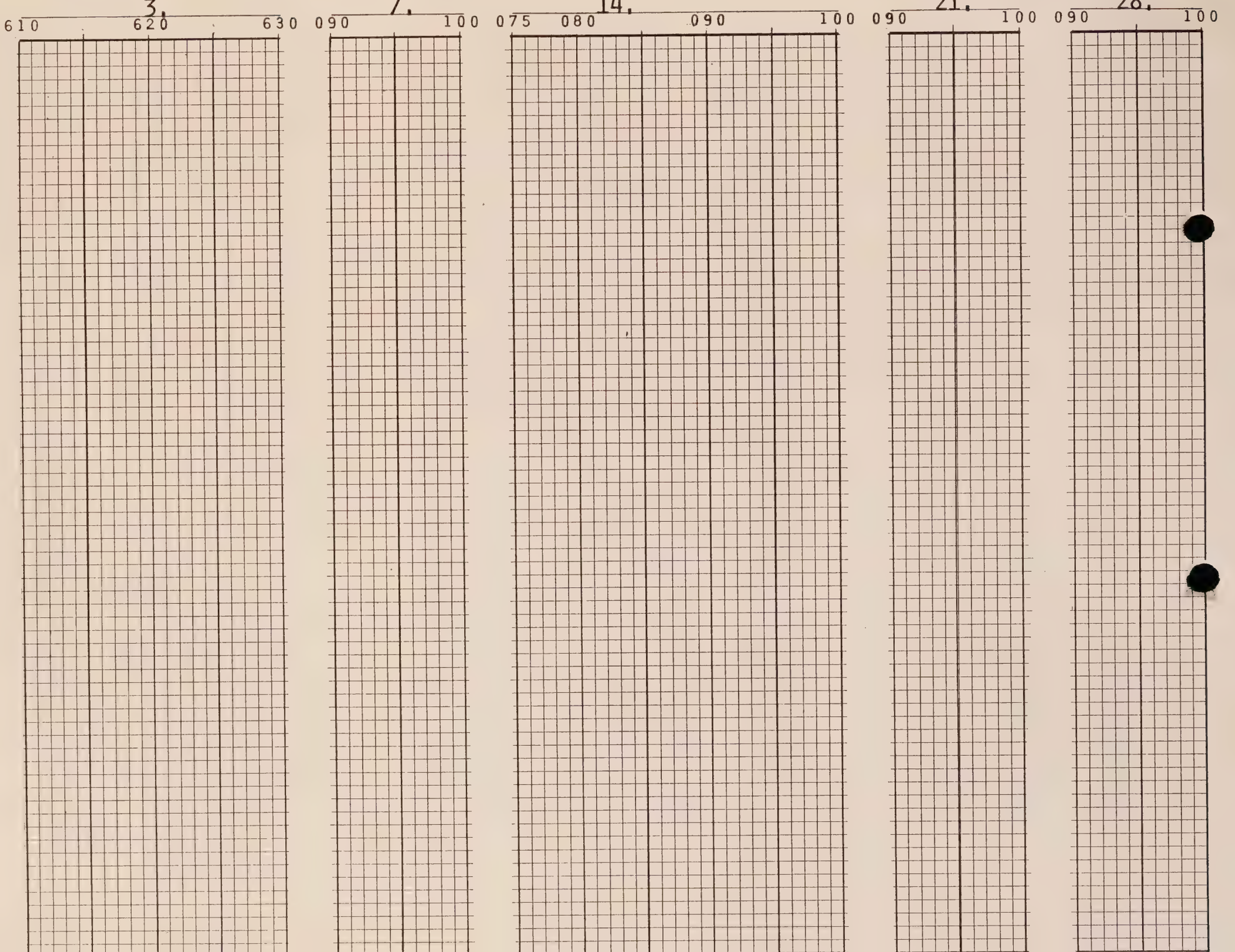
Station _____ RTTY Frequency Activitv Log ☐Day (7→28 MHz) ☐Night (3→14)

Dates



Station _____ RTTY Frequency Activitv Log □Day (7→28 MHz) □Night (3→14)

Dates



AMRAD

Amateur Radio Research and Development Corporation

1524 Springvale Avenue
McLean, Virginia 22101
1981 February 14

Hank S. Magnuski, KA6M
311 Stanford Avenue
Menlo Park, CA 94025

Dear Hank,

Via 3rd class mail I am sending you a copy of a draft I wrote on "Amateur Computer Network Message Protocol." Please take a close look at it and let me know your comments. Also, if you can, I wonder if you could share your copy with Howard Nurse and ask him to do the same.

On the 12th, I took a copy to John Lindholm, W1XX, head of the ARRL Communications Department and asked him to look at it. He told me that he had had several meetings with MARS people in Washington and agreed in principle that it would be a good idea for amateurs and MARS to be using the same procedure. The matter could be quickly solved by getting the MARS people to use ARRL formats as far as ARRL is concerned, and vice versa. Anyway, they have not had any compelling reason to actually do it. Maybe this will help them focus on that. John is very cooperative and is supporting the AMNET concept. I also had a long talk with Dick Baldwin, W1RU and found him totally supportive. I was very pleased with the present attitude toward building an amateur computer network at the ARRL Hq. More of that will unwind as time goes on.

At the ARRL Hq I ran into Pete O'Dell who showed me a copy of your press release, which runs along the line of the letter that you wrote to use and we printed in Dave's column. As far as I know, you have a first, at least in the U.S. Congratulations!

I am working with the ARRL on a proposal for an HF packet net. There is a possibility of the Defense Dept. picking up the tab under a grant aimed toward a survivable communications system for use during/after nuclear attack. It calls for 7 HF nodes (Hartford, CT; Washington, DC; Atlanta, GA; Dallas, TX; Chicago, IL; San Francisco, CA (that's you); and Seattle, WA.) Perry Williams, W1UED and I are supposed to talk to some defense people on the 19th of March.

The ARRL has agreed to set up an HF packet link between W1AW and AMRAD for experimental purposes. I have 2 boards from Doug Lockhart for that link but don't have the parts yet. To begin with, we'll be operating 110-baud start-stop then go packet when the two boards are working.

I am interested in your thoughts on setting up a chain of digital repeaters up and down the West coast. As for the AMRAD Newsletter, I'd be interested in printing anything you have or can write on that subject. We are also interested because there is a possibility of getting the same thing going here. It looks like we can work Newington, CT with 3 relays (New York City, NY; Trenton, NJ; and the DE/PA/MD border area). Also, the same sort of thing would apply South, at least to the Richmond, VA and Norfolk, VA areas where there would also be some interest.

There is some sentiment for an eyeball get-together some time this year. One possibility is Dayton. I'll be going there, so will some others from this area. I expect to see Howard Nurse there and hope to see you if you can come. There is nothing being planned in the way of a formal or even organized meeting at Dayton, just mostly one-on-one meetings. Trying to get a meeting organized there is very difficult considering all the things that are going on. We hope to bring about a networking meeting sometime in September this year if possible. We'd like to see it here in Washington, possibly at the National Bureau of Standards office in Gaithersburg, MD. Is there any chance that you could come if such a meeting were to be set up? If so, could you pay your own expenses or is that a problem? If it is a problem, what would it take to make the problem go away?

Well, that's about it for the moment. Would be pleased to hear more from you either directly or via K8MMO.

73,

Paul

Paul L. Rinaldo, W4RI